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PRELIMINARY REPORT
INDUSTRY SERIES

1987

Census of Manufactures

MC87-I-35C(P)
Issued August 1989

METALWORKING MACHINERY AND EQUIPMENT

Industries 3541, 3542, 3543, 3544, 3545, 3546, 3547, 3548, and 3549

INTRODUCTION

This report presents preliminary statistics from the 1987 Census of Manufactures for those establishments classified in the industries listed above. These data will be superseded by a more comprehensive final paperbound report. The method of data collection and use of administrative data are discussed in detail in the appendix.

All dollar figures included in this report are at prices current for the year specified and, therefore, unadjusted for changes in price levels. Consequently, when making comparisons to prior years, users should take into consideration the inflation that has occurred.

The definitions of these industries are the same as those used in the 1987 Standard Industrial Classification (SIC) Manual.¹

INDUSTRY 3541, MACHINE TOOLS, METAL CUTTING TYPES

In the 1987 Census of Manufactures, Industry 3541, Machine Tools, Metal Cutting Types, had employment of 32.4 thousand. The employment figure was 44 percent below the 58.3 thousand reported in 1982. Compared with 1986, employment in 1987 decreased 16 percent. The 1986 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses.

The total value of shipments for establishments classified in this industry was \$3.2 billion. The products primary to this industry appear in table 2 and aggregated to \$2.7 billion in 1987.

The cost of materials and services used by establishments in this industry amounted to \$1.4 billion in 1987. Data on specific materials consumed appear in table 3.

INDUSTRY 3542, MACHINE TOOLS, METAL FORMING TYPES

In the 1987 Census of Manufactures, Industry 3542, Machine Tools, Metal Forming Types, had employment of 14.0 thousand. The employment figure was 28 percent below the 19.5 thousand reported in 1982. Compared with 1986, employment in 1987 decreased 16 percent. The 1986 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses.

The total value of shipments for establishments classified in this industry was \$1.4 billion. The products primary to this industry appear in table 2 and aggregated to \$1.4 billion in 1987.

The cost of materials and services used by establishments in this industry amounted to \$646.4 million in 1987. Data on specific materials consumed appear in table 3.

INDUSTRY 3543, INDUSTRIAL PATTERNS

In the 1987 Census of Manufactures, Industry 3543, Industrial Patterns, had employment of 8.4 thousand. The employment figure was 14 percent below the 9.8 thousand reported in 1982.

The total value of shipments for establishments classified in this industry was \$489.1 million. The products primary to this industry appear in table 2 and aggregated to \$545.3 million in 1987.

¹Standard Industrial Classification Manual: 1987. For sale by Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Stock No. 041-001-00314-2.

Address inquiries to Bureau of the Census, Industry Division, Washington, DC 20233, or call Mary Jane Gwynn (301) 763-7304.



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The cost of materials and services used by establishments in this industry amounted to \$111.5 million in 1987. Data on specific materials consumed appear in table 3.

INDUSTRY 3544, SPECIAL DIES, TOOLS, AND JIGS AND FIXTURES

In the 1987 Census of Manufactures, Industry 3544, Special Dies, Tools, and Jigs and Fixtures, had employment of 115.7 thousand. The employment figure was 12 percent above the 102.9 thousand reported in 1982. Compared with 1986, employment in 1987 increased 6 percent. The 1986 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses.

The total value of shipments for establishments classified in this industry was \$7.6 billion. The products primary to this industry appear in table 2 and aggregated to \$8.2 billion in 1987.

The cost of materials and services used by establishments in this industry amounted to \$2.2 billion in 1987. Data on specific materials consumed appear in table 3.

INDUSTRY 3545, MACHINE TOOL ACCESSORIES

In the 1987 Census of Manufactures, Industry 3545, Machine Tool Accessories, had employment of 47.7 thousand. The employment figure was 13 percent below the 55.1 thousand reported in 1982.

The total value of shipments for establishments classified in this industry was \$3.6 billion. The products primary to this industry appear in table 2 and aggregated to \$3.4 billion in 1987.

The cost of materials and services used by establishments in this industry amounted to \$1.0 billion in 1987. Data on specific materials consumed appear in table 3.

INDUSTRY 3546, POWER-DRIVEN HANDTOOLS

In the 1987 Census of Manufactures, Industry 3546, Power-Driven Handtools, had employment of 16.8 thousand. The employment figure was 22 percent below the 21.6 thousand reported in 1982. Compared with 1986, employment in 1987 decreased 6 percent. The 1986 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses.

The total value of shipments for establishments classified in this industry was \$2.2 billion. The products primary to this industry appear in table 2 and aggregated to \$1.9 billion in 1987.

The cost of materials and services used by establishments in this industry amounted to \$1.0 billion in 1987. Data on specific materials consumed appear in table 3.

INDUSTRY 3547, ROLLING MILL MACHINERY

In the 1987 Census of Manufactures, Industry 3547, Rolling Mill Machinery, had employment of 3.9 thousand. The employment figure was 24 percent below the 5.1 thousand reported in 1982. Compared with 1986, employment in 1987 increased 11 percent. The 1986 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses.

The total value of shipments for establishments classified in this industry was \$467.7 million. The products primary to this industry appear in table 2 and aggregated to \$403.1 million in 1987.

The cost of materials and services used by establishments in this industry amounted to \$249.6 million in 1987. Data on specific materials consumed appear in table 3.

INDUSTRY 3548, WELDING APPARATUS

In the 1987 Census of Manufactures, Industry 3548, Welding Apparatus, had employment of 18.5 thousand.

The total value of shipments for establishments classified in this industry was \$2.1 billion. The products primary to this industry appear in table 2 and aggregated to \$1.9 billion in 1987.

The cost of materials and services used by establishments in this industry amounted to \$1.1 billion in 1987. Data on specific materials consumed appear in table 3.

INDUSTRY 3549, METALWORKING MACHINERY, N.E.C.

In the 1987 Census of Manufactures, Industry 3549, Metalworking Machinery, N.E.C., had employment of 11.4 thousand.

The total value of shipments for establishments classified in this industry was \$1.0 billion. The products primary to this industry appear in table 2 and aggregated to \$1.0 billion in 1987.

The cost of materials and services used by establishments in this industry amounted to \$444.2 million in 1987. Data on specific materials consumed appear in table 3.

ABBREVIATIONS AND SYMBOLS

The following abbreviations and symbols are used in the tables in this publication:

-	Represents zero.
(D)	Withheld to avoid disclosing data for individual companies; data are included in higher level totals.
(NA)	Not available.
(NC)	Not comparable.

- (S) Withheld because estimate did not meet publication standards on the basis of either the response rate or a consistency review.
- (X) Not applicable.
- (Z) Less than half the unit shown.
- do Ditto.
- n.e.c. Not elsewhere classified.
- n.s.k. Not specified by kind.
- pt. Part.
- r Revised.
- SIC Standard Industrial Classification.

Other abbreviations, such as lb, gal, yd, doz, bbl, and s tons, are used in the customary sense.

CONTACTS FOR DATA USERS

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Census/ASM		
Durables	Kenneth Hansen	(301) 763-7304
Nondurables	Michael Zampogna	(301) 763-2510
Current Industrial Reports		
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Nondurables	Thomas Flood	(301) 763-5911
Import/Export Publications	Foreign Trade Division	(301) 763-5140
Industry Analysis and Forecasts	International Trade Administration	(202) 377-4356

Table 1. Historical Statistics for the Industry: 1987 and Earlier Years

[Excludes data for auxiliaries. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendix]

Year ¹	All establishments ³			All employees		Production workers			Value added by manufacture ⁴ (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)	End-of-year inventories ⁴ (million dollars)	Ratios	
	Companies ² (no.)	Total (no.)	With 20 employees or more (no.)	Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)						Specialization (percent)	Coverage (percent)
INDUSTRY 3541, MACHINE TOOLS, METAL CUTTING TYPES															
1987 Census ----	(NA)	435	245	32.4	938.5	18.6	36.3	475.0	1 698.7	1 423.7	3 242.6	62.4	1 069.1	(NA)	(NA)
1986 ASM -----	(NA)	(NA)	(NA)	38.6	1 088.8	22.0	43.6	557.0	1 823.8	1 538.0	3 456.1	62.7	1 215.6	(NA)	(NA)
1985 ASM -----	(NA)	(NA)	(NA)	42.8	1 127.6	24.9	47.7	592.6	2 000.0	1 471.6	3 377.0	91.6	1 349.7	(NA)	(NA)
1984 ASM -----	(NA)	(NA)	(NA)	42.4	1 053.9	24.7	46.5	541.7	1 820.0	1 369.5	3 211.6	108.8	1 196.5	(NA)	(NA)
1983 ASM -----	(NA)	(NA)	(NA)	43.0	997.1	24.5	45.9	512.1	1 612.7	1 100.0	2 880.9	104.8	1 281.6	(NA)	(NA)
1982 Census ----	865	942	293	58.3	1 335.0	33.9	63.6	709.2	2 516.2	1 598.3	4 411.5	157.7	1 435.5	91	93
1981 ASM -----	(NA)	(NA)	(NA)	74.3	1 633.0	47.9	98.5	964.1	3 739.9	2 187.3	5 865.3	233.2	1 485.5	(NA)	(NA)
1980 ASM -----	(NA)	(NA)	(NA)	72.8	1 504.0	47.8	98.8	889.5	3 349.2	2 026.1	5 227.6	171.6	1 419.4	(NA)	(NA)
1979 ASM -----	(NA)	(NA)	(NA)	69.1	1 304.1	45.7	95.9	786.9	2 833.8	1 736.9	4 389.0	147.6	1 242.2	(NA)	(NA)
1978 ASM -----	(NA)	(NA)	(NA)	64.3	1 120.7	42.2	88.2	679.6	2 267.0	1 417.7	3 611.8	102.0	1 012.3	(NA)	(NA)
1977 Census ----	872	917	306	59.4	949.0	37.2	76.3	540.7	1 866.1	1 047.7	2 812.7	80.4	877.9	87	92
1976 ASM -----	(NA)	(NA)	(NA)	58.1	845.4	37.6	73.5	473.9	1 664.1	852.3	2 496.2	65.2	735.4	(NA)	(NA)
1975 ASM -----	(NA)	(NA)	(NA)	62.8	850.3	40.8	81.7	486.8	1 640.3	1 050.3	2 727.8	52.2	737.9	(NA)	(NA)
1974 ASM -----	(NA)	(NA)	(NA)	65.0	874.4	43.9	92.5	509.8	1 617.0	1 017.9	2 480.5	58.9	786.2	(NA)	(NA)
1973 ASM -----	(NA)	(NA)	(NA)	59.9	709.4	39.8	83.3	417.9	1 214.1	1 891.1	38.4	591.9	(NA)	(NA)	
1972 Census ----	857	894	275	52.5	573.8	33.4	68.2	325.9	901.7	536.3	1 418.1	35.2	482.2	86	90
INDUSTRY 3542, MACHINE TOOLS, METAL FORMING TYPES															
1987 Census ----	(NA)	217	126	14.0	420.2	8.9	18.5	240.2	721.7	646.4	1 415.2	31.6	534.2	(NA)	(NA)
1986 ASM -----	(NA)	(NA)	(NA)	16.6	440.5	10.7	21.4	257.3	765.7	713.2	1 507.9	33.9	524.2	(NA)	(NA)
1985 ASM -----	(NA)	(NA)	(NA)	17.7	461.6	11.5	23.0	275.4	933.2	598.7	1 412.8	43.7	569.3	(NA)	(NA)
1984 ASM -----	(NA)	(NA)	(NA)	16.1	407.0	10.5	20.7	242.7	775.9	535.4	1 308.7	31.0	424.0	(NA)	(NA)
1983 ASM -----	(NA)	(NA)	(NA)	15.3	357.0	9.6	17.8	196.0	629.6	454.9	1 142.3	*28.1	431.6	(NA)	(NA)
1982 Census ----	435	452	162	19.5	438.1	12.1	23.2	245.3	777.8	574.6	1 428.7	43.4	511.5	89	87
1981 ASM -----	(NA)	(NA)	(NA)	24.0	496.8	16.0	30.8	294.9	976.5	662.7	1 615.7	63.0	479.7	(NA)	(NA)
1980 ASM -----	(NA)	(NA)	(NA)	26.9	514.1	18.2	35.2	313.2	1 042.1	718.5	1 753.1	69.4	455.2	(NA)	(NA)
1979 ASM -----	(NA)	(NA)	(NA)	27.0	485.6	18.7	37.5	305.1	1 004.0	687.0	1 663.5	58.1	447.0	(NA)	(NA)
1978 ASM -----	(NA)	(NA)	(NA)	25.2	415.6	17.0	35.1	253.2	841.3	576.4	1 366.0	40.4	421.7	(NA)	(NA)
1977 Census ----	411	426	163	23.7	360.7	16.1	32.8	219.4	721.9	444.0	1 130.6	24.7	359.6	90	87
1976 ASM -----	(NA)	(NA)	(NA)	22.9	336.8	15.9	32.0	214.2	621.1	433.9	1 070.7	28.3	312.9	(NA)	(NA)
1975 ASM -----	(NA)	(NA)	(NA)	26.0	343.1	17.7	35.8	208.2	618.3	483.2	1 106.6	23.9	362.5	(NA)	(NA)
1974 ASM -----	(NA)	(NA)	(NA)	29.0	370.8	20.3	43.3	238.2	633.7	505.4	1 099.3	34.4	363.8	(NA)	(NA)
1973 ASM -----	(NA)	(NA)	(NA)	27.0	323.6	18.9	41.8	205.1	546.5	370.8	886.2	27.5	293.8	(NA)	(NA)
1972 Census ----	375	383	162	24.1	265.4	16.6	34.7	163.8	417.7	285.3	696.3	17.5	242.7	89	87
INDUSTRY 3543, INDUSTRIAL PATTERNS ⁶															
1987 Census ----	(NA)	807	83	8.4	230.9	6.8	13.5	180.5	379.3	111.5	489.1	17.9	41.3	(NA)	(NA)
1986 ASM ⁷ -----	(NA)	(NA)	(NA)	6.9	191.7	5.8	12.3	155.3	384.9	216.8	590.4	14.1	43.6	(NA)	(NA)
1985 ASM ⁷ -----	(NA)	(NA)	(NA)	7.1	188.1	6.0	12.0	152.6	349.0	216.1	549.3	15.6	60.4	(NA)	(NA)
1984 ASM ⁷ -----	(NA)	(NA)	(NA)	7.0	173.7	5.8	11.1	137.0	312.2	186.3	461.1	11.4	45.5	(NA)	(NA)
1983 ASM -----	(NA)	(NA)	(NA)	10.2	218.9	8.3	14.9	177.2	311.8	112.2	417.2	*14.4	32.9	(NA)	(NA)
1982 Census ----	994	996	105	9.8	217.6	8.1	14.8	173.4	347.6	97.6	452.3	15.8	29.6	97	76
1981 ASM ⁷ -----	(NA)	(NA)	(NA)	9.2	216.6	7.4	13.8	170.0	349.0	103.0	453.3	12.3	37.2	(NA)	(NA)
1980 ASM ⁷ -----	(NA)	(NA)	(NA)	9.6	183.1	7.6	13.5	145.3	310.7	113.8	415.2	(S)	35.8	(NA)	(NA)
1979 ASM ⁷ -----	(NA)	(NA)	(NA)	9.9	184.3	8.5	15.0	145.7	302.3	103.9	399.5	10.8	31.2	(NA)	(NA)
1978 ASM ⁷ -----	(NA)	(NA)	(NA)	9.4	167.0	8.0	15.5	130.1	268.6	73.8	335.6	17.1	30.1	(NA)	(NA)
1977 Census ----	1 001	1 002	115	9.3	152.7	8.0	15.8	122.2	252.5	72.0	320.6	11.1	25.2	97	75
1976 ASM -----	(NA)	(NA)	(NA)	8.5	140.0	7.1	15.5	113.4	211.5	61.1	273.3	14.2	20.3	(NA)	(NA)
1975 ASM -----	(NA)	(NA)	(NA)	8.9	138.7	7.2	15.8	112.4	219.8	63.6	287.9	12.2	19.4	(NA)	(NA)
1974 ASM -----	(NA)	(NA)	(NA)	10.0	144.0	8.2	17.6	115.9	247.6	67.0	313.1	6.5	28.6	(NA)	(NA)
1973 ASM -----	(NA)	(NA)	(NA)	9.2	117.1	7.9	15.1	96.7	185.1	41.4	224.1	5.0	15.0	(NA)	(NA)
1972 Census ----	1 017	1 021	97	8.5	103.1	7.4	13.9	85.3	161.0	38.8	198.0	5.3	12.9	95	78
INDUSTRY 3544, SPECIAL DIES, TOOLS, AND JIGS AND FIXTURES															
1987 Census ----	(NA)	7 220	1 515	115.7	3 166.7	87.7	185.6	2 255.5	5 320.3	2 210.6	7 560.2	375.7	948.0	(NA)	(NA)
1986 ASM -----	(NA)	(NA)	(NA)	108.9	3 000.1	85.7	179.4	2 165.1	5 582.2	2 158.1	7 725.1	333.6	913.6	(NA)	(NA)
1985 ASM -----	(NA)	(NA)	(NA)	110.6	2 904.4	88.6	183.3	2 123.1	5 222.2	2 069.9	7 204.8	401.8	861.5	(NA)	(NA)
1984 ASM -----	(NA)	(NA)	(NA)	111.2	2 737.8	89.7	188.1	2 021.3	4 681.5	2 010.7	6 614.7	398.8	703.2	(NA)	(NA)
1983 ASM -----	(NA)	(NA)	(NA)	97.9	2 294.4	78.2	161.1	1 662.5	3 801.7	1 537.1	5 310.6	192.4	590.5	(NA)	(NA)
1982 Census ----	7 132	7 255	1 322	102.9	2 293.3	81.7	164.9	1 684.9	3 780.5	1 535.4	5 374.9	232.9	621.8	94	79
1981 ASM -----	(NA)	(NA)	(NA)	124.2	2 632.4	99.6	209.3	1 905.7	4 423.7	1 884.8	6 264.3	275.9	693.1	(NA)	(NA)
1980 ASM -----	(NA)	(NA)	(NA)	126.3	2 471.0	101.6	214.3	1 798.7	4 121.0	1 734.3	5 823.9	283.5	646.3	(NA)	(NA)
1979 ASM -----	(NA)	(NA)	(NA)	122.1	2 231.2	98.9	214.5	1 641.7	3 810.6	1 607.5	5 336.2	294.4	574.7	(NA)	(NA)
1978 ASM -----	(NA)	(NA)	(NA)	112.5	1 946.6	92.7	195.2	1 419.9	3 183.2	1 424.2	4 585.1	228.9	510.2	(NA)	(NA)
1977 Census ----	7 034	7 153	1 427	105.7	1 708.2	86.4	184.0	1 261.7	2 790.1	1 171.8	3 905.3	177.5	450.3	94	79
1976 ASM -----	(NA)	(NA)	(NA)	109.9	1 537.0	88.7	179.4	1 163.2	2 502.1	951.0	3 411.6	168.9	370.3	(NA)	(NA)
1975 ASM -----	(NA)	(NA)	(NA)	102.9	1 336.6	83.8	168.7	1 005.8	2 141.8	824.7	2 985.6	114.4	315.8	(NA)	(NA)
1974 ASM -----	(NA)	(NA)	(NA)	117.4	1 486.6	97.2	205.7	1 134.4	2 459.5	928.8	3 367.5	193.1	328.3	(NA)	(NA)
1973 ASM -----	(NA)	(NA)	(NA)	105.7	1 314.8	87.4	193.6	999.9	2 256.2	782.8	2 930.7	101.7	300.4	(NA)	(NA)
1972 Census ----	6 513	6 616	1 266	97.8	1 113.8	80.5	173.3	843.6	1 797.4	648.0	2 423.7	97.0	244.1	94	78
INDUSTRY 3545, MACHINE TOOL ACCESSORIES															
1987 Census ----	(NA)	1 846	554	47.7	1 145.3	34.5	70.1	722.7	2 532.8	1 023.8	3 551.0	109.0	800.6	(NA)	(NA)
1986 ASM -----	(NA)	(NA)	(NA)	47.0	1 113.0	34.0	68.3	720.3	2 423.7	1 002.7	3 452.3	108.5	776.2	(NA)	(NA)
1985 ASM -----	(NA)	(NA)	(NA)	49.4	1 099.5	36.4	73.2	718.0	2 429.2	1 025.8	3 458.8	167.9	813.6	(NA)	(NA)
1984 ASM -----	(NA)	(NA)	(NA)	49.5	1 087.9	36.2	72.8	711.2	2 432.7						

Table 1. Historical Statistics for the Industry: 1987 and Earlier Years—Con.

[Excludes data for auxiliaries. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendix.]

Year ¹	Companies ² (no.)	All establishments ³		All employees		Production workers			Value added by manufacture ⁴ (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)	End-of-year inventories ⁴ (million dollars)	Ratios	
		Total (no.)	With 20 employees or more (no.)	Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)						Specialization (percent)	Coverage (percent)
INDUSTRY 3545, MACHINE TOOL ACCESSORIES—Con.															
1977 Census ----	1 270	1 411	491	54.0	762.0	39.9	80.1	498.0	1 584.8	832.5	2 383.0	77.2	468.3	89	88
1976 ASM ----	(NA)	(NA)	(NA)	51.0	634.4	37.6	73.5	414.4	1 293.4	653.6	1 942.3	51.5	406.0	(NA)	(NA)
1975 ASM ----	(NA)	(NA)	(NA)	52.4	616.4	38.2	77.1	405.3	1 236.2	599.1	1 847.8	50.3	411.4	(NA)	(NA)
1974 ASM ----	(NA)	(NA)	(NA)	56.1	625.6	41.7	86.9	422.7	1 322.0	609.8	1 884.1	59.5	425.2	(NA)	(NA)
1973 ASM ----	(NA)	(NA)	(NA)	52.8	569.3	39.2	81.4	380.6	1 142.6	496.4	1 602.4	36.6	344.4	(NA)	(NA)
1972 Census ----	1 113	1 231	413	46.7	456.6	33.6	67.0	294.5	876.1	378.5	1 243.4	30.2	289.0	86	87
INDUSTRY 3546, POWER-DRIVEN HANDTOOLS															
1987 Census ----	(NA)	199	68	16.8	379.5	11.6	22.2	220.4	1 121.0	1 044.9	2 156.7	48.0	361.2	(NA)	(NA)
1986 ASM ----	(NA)	(NA)	(NA)	17.9	383.8	12.5	24.0	229.3	1 121.5	998.3	2 142.4	72.1	362.1	(NA)	(NA)
1985 ASM ----	(NA)	(NA)	(NA)	19.2	398.4	13.2	23.9	240.1	1 141.3	996.2	2 155.1	80.3	388.9	(NA)	(NA)
1984 ASM ----	(NA)	(NA)	(NA)	20.0	392.2	14.2	26.4	245.1	1 088.8	965.9	2 016.3	50.6	423.1	(NA)	(NA)
1983 ASM ----	(NA)	(NA)	(NA)	19.5	385.1	13.3	24.9	223.2	1 015.9	788.7	1 801.9	45.4	398.8	(NA)	(NA)
1982 Census ----	180	203	74	21.6	393.6	14.5	25.9	228.6	940.3	791.5	1 795.3	68.1	415.0	88	91
1981 ASM ----	(NA)	(NA)	(NA)	26.0	434.2	18.5	35.7	279.4	1 264.1	931.5	2 144.7	79.3	489.7	(NA)	(NA)
1980 ASM ----	(NA)	(NA)	(NA)	30.5	440.0	22.5	41.5	289.9	1 294.6	1 002.1	2 298.8	82.9	448.0	(NA)	(NA)
1979 ASM ----	(NA)	(NA)	(NA)	32.3	446.8	24.0	45.9	301.2	1 205.2	1 015.9	2 197.2	85.1	446.1	(NA)	(NA)
1978 ASM ----	(NA)	(NA)	(NA)	29.8	377.5	21.9	41.8	244.1	1 069.2	870.9	1 929.1	49.9	352.9	(NA)	(NA)
1977 Census ----	99	124	71	27.7	325.7	20.0	38.5	210.4	931.9	703.2	1 623.2	39.0	326.0	91	90
1976 ASM ----	(NA)	(NA)	(NA)	22.0	261.8	15.9	30.4	165.6	702.5	452.7	1 140.7	21.1	262.5	(NA)	(NA)
1975 ASM ----	(NA)	(NA)	(NA)	21.2	219.9	14.7	27.4	136.8	603.8	418.1	1 059.2	22.3	271.4	(NA)	(NA)
1974 ASM ----	(NA)	(NA)	(NA)	26.1	252.7	19.3	37.4	167.3	721.6	436.5	1 119.6	35.5	316.5	(NA)	(NA)
1973 ASM ----	(NA)	(NA)	(NA)	26.5	249.0	18.8	37.3	159.8	562.0	397.1	921.4	25.6	265.1	(NA)	(NA)
1972 Census ----	71	88	65	23.1	202.3	16.9	32.9	124.2	434.5	302.7	730.5	20.3	199.7	82	92
INDUSTRY 3547, ROLLING MILL MACHINERY															
1987 Census ----	(NA)	85	34	3.9	120.6	2.2	4.7	57.3	285.0	249.6	467.7	7.0	170.7	(NA)	(NA)
1986 ASM ----	(NA)	(NA)	(NA)	3.5	101.1	1.9	3.8	46.9	169.6	209.7	380.8	3.6	94.3	(NA)	(NA)
1985 ASM ----	(NA)	(NA)	(NA)	3.9	106.7	2.2	4.4	53.8	196.7	213.0	453.7	9.2	85.7	(NA)	(NA)
1984 ASM ----	(NA)	(NA)	(NA)	3.3	89.3	2.0	3.8	45.5	192.8	168.5	323.1	6.0	128.4	(NA)	(NA)
1983 ASM ⁷ ----	(NA)	(NA)	(NA)	4.1	94.1	2.5	4.5	51.5	114.2	182.0	373.6	5.3	109.7	(NA)	(NA)
1982 Census ----	58	63	32	5.1	125.1	3.3	6.1	70.8	276.4	246.8	502.9	14.8	168.1	79	79
1981 ASM ----	(NA)	(NA)	(NA)	6.0	135.1	3.9	7.6	81.9	410.4	341.4	736.3	8.3	161.5	(NA)	(NA)
1980 ASM ----	(NA)	(NA)	(NA)	6.4	139.4	4.5	8.6	87.3	358.1	314.3	687.1	12.8	132.0	(NA)	(NA)
1979 ASM ----	(NA)	(NA)	(NA)	6.1	119.3	4.2	8.7	76.9	296.1	232.3	481.9	⁵ 30.9	154.0	(NA)	(NA)
1978 ASM ----	(NA)	(NA)	(NA)	7.6	137.6	5.3	9.3	83.6	289.7	189.3	495.2	7.6	118.8	(NA)	(NA)
1977 Census ----	58	63	38	7.9	128.2	5.4	10.4	78.4	286.9	198.3	507.4	9.1	131.8	78	86
1976 ASM ----	(NA)	(NA)	(NA)	10.9	156.2	7.8	14.8	99.3	350.9	247.4	620.8	14.5	168.4	(NA)	(NA)
1975 ASM ----	(NA)	(NA)	(NA)	10.6	141.1	8.0	15.2	95.3	331.0	259.7	540.5	12.1	181.1	(NA)	(NA)
1974 ASM ----	(NA)	(NA)	(NA)	10.3	132.9	8.1	16.1	92.6	297.1	202.0	472.2	11.1	136.0	(NA)	(NA)
1973 ASM ----	(NA)	(NA)	(NA)	9.2	108.1	7.1	14.3	73.1	244.6	152.6	377.2	7.7	106.6	(NA)	(NA)
1972 Census ----	40	47	38	10.4	115.2	7.2	14.2	68.7	206.4	129.0	327.8	6.3	81.0	74	86
INDUSTRY 3548, WELDING APPARATUS ⁶															
1987 Census ----	(NA)	222	128	18.5	535.7	11.4	23.9	288.3	1 078.1	1 053.1	2 089.9	45.8	552.2	(NA)	(NA)
INDUSTRY 3549, METALWORKING MACHINERY, N.E.C. ⁸															
1987 Census ----	(NA)	299	146	11.4	335.0	7.0	14.5	180.6	587.3	444.2	1 037.7	21.3	263.8	(NA)	(NA)

Note: Establishments of single unit companies with up to 20 employees (cutoff varied by industry) were excluded from the mail portion of the census. Data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were estimated based on administrative-record information from other agencies in conjunction with industry averages. These establishments accounted for the following percent of total value of shipments: SIC 3541, 12%; SIC 3542, 10%; SIC 3543, 20%; SIC 3544, 18%; SIC 3545, 18%; SIC 3546, 5%; SIC 3547, 5%; SIC 3548, 10%; and SIC 3549, 15%.

¹In annual survey of manufactures (ASM) years, data are estimates based on a representative sample of establishments canvassed annually and may differ from results of a complete canvass of all establishments. ASM publication shows percentage standard errors. Unless otherwise noted, for data prior to 1972, see 1972 Census of Manufactures, vol. II, table 1a of the Industry chapter.

²For the census, a company is defined as a business organization consisting of one establishment or more under common ownership or control.

³Includes establishments with payroll at any time during year.

⁴Beginning with the 1982 Census of Manufactures, all respondents were requested to report their inventories at (the lower of) cost or market prior to adjustment to LIFO cost. This is a change from prior Censuses and annual surveys of manufactures in which respondents were permitted to value their inventories using any generally accepted accounting method. Consequently, inventories and value added by manufacture are not comparable to prior-year data.

⁵Estimates for new capital expenditures have associated standard error of 15 percent or more and may be of limited reliability. Estimates for other data items are of acceptable reliability.

⁶Although there was no change in definition or content, old SIC Industry 3563, Industrial Patterns, was renumbered to new SIC Industry 3543.

⁷Data either have associated standard errors exceeding 15 percent or are not consistent with other census series and related data; thus, these estimates may be of limited reliability.

⁸Industry definition is new for 1987 Census of Manufactures. An explanation of the Standard Industrial Classification revision will appear in the final industry series text that supersedes this report.

Table 2. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1987 and 1982

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendix. For meaning of abbreviations and symbols, see introductory text.]

1987 product code	Product	1987			1982		
		Number of companies with shipments of \$100,000 or more	Product shipments ¹		Number of companies with shipments of \$100,000 or more	Product shipments ¹	
			Quantity ²	Value (million dollars)		Quantity ²	Value (million dollars)
3541--	MACHINE TOOLS, METAL CUTTING TYPES						
	Total	(NA)	(X)	2 660.0	(NA)	(X)	4 154.7
3541D --	Boring machines (excluding machining centers) and drilling machines (excluding machining centers):						
3541D 00	Boring machines (excluding machining centers) and drilling machines (excluding machining centers) (for additional detail, see Current Industrial Report MQ-35W, Metalworking Machinery)	(NA)	(X)	155.9	72	(X)	266.0
35413 --	Gear cutting machines:						
35413 00	Gear cutting machines (for additional detail, see Current Industrial Report MQ-35W, Metalworking Machinery)	(NA)	(X)	62.4	11	(X)	87.3
35414 --	Grinding, polishing, buffing, honing, and lapping machines, except gear-tooth grinding, lapping, polishing, and buffing machines:						
35414 00	Grinding, polishing, buffing, honing, and lapping machines, except gear-tooth grinding, lapping, polishing, and buffing machines (for additional detail, see Current Industrial Report MQ-35W, Metalworking Machinery)	(NA)	(X)	423.5	90	(X)	515.3
35415 --	Lathes:						
35415 00	Lathes (turning machines) (for additional detail, see Current Industrial Report MQ-35W, Metalworking Machinery)	(NA)	(X)	269.1	45	(X)	523.6
35416 --	Milling machines:						
35416 00	Milling machines, excluding machining centers (for additional detail, see Current Industrial Report MQ-35W, Metalworking Machinery)	(NA)	(X)	198.5	34	(X)	264.5
3541A --	Machining centers:						
3541A 00	Machining centers (multifunction numerically controlled machines) (for additional detail, see Current Industrial Report MQ-35W, Metalworking Machinery)	(NA)	(X)	236.7	22	(X)	365.7
3541B --	Station type machines:						
3541B 00	Station type machines (for additional detail, see Current Industrial Report MQ-35W, Metalworking Machinery)	(NA)	(X)	316.5	34	(X)	735.4
3541C --	Other metal cutting machine tools:						
3541C 00	Other metal cutting machine tools (except those designed primarily for home workshops, laboratories, etc.), including broaching machines, planers, shapers (except gear shapers and slotters), sawing and cut-off machines, tapping machines, threading machines, spark erosion, ultrasonic, and electrolytic machines, n.e.c., etc. (for additional detail, see Current Industrial Report MQ-35W, Metalworking Machinery)	(NA)	(X)	195.5	94	(X)	250.6
35418 --	Machine tools designed primarily for home workshops, laboratories, garages, etc. (metalworking and primarily metalworking only)	(NA)	(X)	99.4	(NA)	(X)	85.7
35418 11	Drilling machines	(NA)	(S)	15.5	6	(S)	9.6
35418 31	Grinding and polishing machines, including crankshaft regrounding and valve grinding machines	(NA)	(S)	21.1	17	(S)	26.5
35418 51	Lathes	(NA)	(S)	11.0	9	(S)	9.0
35418 71	Sawing and cut-off machines	(NA)	(S)	17.5	19	(S)	40.3
35418 91	Other metalworking (or primarily metalworking) types, including automotive cylinder reboring machines	(NA)	(S)	25.7	19	(S)	40.3
35418 00	Machine tools designed primarily for home workshops, laboratories, garages, etc. (metalworking and primarily metalworking only), n.s.k.	(NA)	(X)	8.6	(NA)	(X)	.3
35419 --	Parts for metal cutting type machine tools, sold separately, and rebuilt metal cutting type machine tools	(NA)	(X)	568.7	(NA)	(X)	891.9
35419 11	Parts for metal cutting machine tools, sold separately	(NA)	(X)	376.6	206	(X)	725.3
	Rebuilt metal cutting type machine tools:						
35419 21	Spark erosion, ultrasonic, and electrolytic machines	(NA)	(D)	(?)			
35419 22	Machining centers and multistation machines	(NA)	(S)	44.6			
35419 23	Lathes	(NA)	(S)	45.6			
35419 24	Drilling, threading, milling, boring, or tapping machines	(NA)	(S)	31.1	65	(X)	153.9
35419 25	Deburring, sharpening, grinding, honing, lapping, and other finishing machines	(NA)	(S)	16.6			
35419 26	Other rebuilt metal cutting machine tools	(NA)	(S)	31.3			
35419 00	Parts for metal cutting type machine tools, sold separately, and rebuilt metal cutting type machine tools, n.s.k.	(NA)	(X)	22.9	(NA)	(X)	12.7
35410 --	Machine tools, metal cutting types, n.s.k.	(NA)	(X)	133.9	(NA)	(X)	168.7
35410 00	Machine tools, metal cutting, n.s.k., typically for establishments with 10 employees or more (see note)	(NA)	(X)	133.9	(NA)	(X)	27.4
35410 02	Machine tools, metal cutting, n.s.k., typically for establishments with less than 10 employees (see note)	(NA)	(X)	-	(NA)	(X)	141.3

See footnotes at end of table.

**Table 2. Product and Product Classes—Quantity and Value of Shipments by All Producers:
1987 and 1982—Con.**

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendix. For meaning of abbreviations and symbols, see introductory text.]

1987 product code	Product	1987		1982	
		Number of companies with shipments of \$100,000 or more	Value of product shipments ¹ (million dollars)	Number of companies with shipments of \$100,000 or more	Value of product shipments ¹ (million dollars)
3542- —	MACHINE TOOLS, METAL FORMING TYPES				
	Total	(NA)	1 382.4	(NA)	1 383.9
35421 — 35421 00	Punching, shearing, bending, and forming machines: Punching and shearing machines (including power and manual) and bending and forming machines (power only) (for additional detail, see Current Industrial Report MQ-35W, Metalworking Machinery)	(NA)	331.4	94	317.3
35422 — 35422 00	Presses, except forging and die stamping: Metalworking presses (except forging and die stamping presses) (for additional detail, see Current Industrial Report MQ-35W, Metalworking Machinery)	(NA)	278.1	76	369.2
35423 — 35423 00	Other metal forming machine tools, including forging and die stamping machines: Other metal forming machine tools, including forging and die stamping machines, thread rolling machinery, die casting machines, riveting machines (except handheld portable types), can, barrel, and drum metal container making machines, etc. (for additional detail, see Current Industrial Report MQ-35W, Metalworking Machinery)	(NA)	298.6	74	217.0
35424 —	Parts for metal forming machine tools and rebuilt metal forming machine tools	(NA)	388.6	(NA)	380.0
35424 01	Parts for metal forming machine tools (sold separately): For die casting machines	(NA)	12.2	141	318.0
35424 02	For other metal forming machine tools	(NA)	305.9		
35424 03	Rebuilt metal forming machine tools: Die casting machines	(NA)	(*)	24	60.0
35424 04	Machines, including presses, for working metal by hammering, forging, die stamping, bending, folding, straightening, flattening, pinching, shearing, or notching	(NA)	23.9		
35424 05	Other rebuilt metal forming machine tools	(NA)	*22.0		
35424 00	Parts for metal forming machine tools and rebuilt metal forming machine tools, n.s.k.	(NA)	24.6	(NA)	2.0
35420 — 35420 00	Machine tools, metal forming types, n.s.k.	(NA)	85.7	(NA)	100.5
35420 01	Machine tools, metal forming types, n.s.k., typically for establishments with 10 employees or more (see note)	(NA)	85.7	(NA)	56.9
35420 02	Machine tools, metal forming types, n.s.k., typically for establishments with less than 10 employees (see note)	(NA)	(NA)	(NA)	43.6
3543- —	INDUSTRIAL PATTERNS				
	Total	(NA)	545.3	(NA)	561.5
35430 — 35430 11 35430 98 35430 00	Industrial patterns, except shoe patterns: Foundry patterns	(NA)	340.3	562	350.1
35430 01	All other industrial patterns (except shoe patterns)	(NA)	72.5	218	133.8
35430 02	Industrial patterns, n.s.k., typically for establishments with 5 employees or more (see note)	(NA)	82.2	(NA)	45.2
35430 03	Industrial patterns, n.s.k., typically for establishments with less than 5 employees (see note)	(NA)	50.2	(NA)	32.4
3544- —	SPECIAL DIES, TOOLS, JIGS, AND FIXTURES				
	Total	(NA)	8 156.3	(NA)	6 099.3
35441 —	Special dies and tools, die sets, jigs, and fixtures	(NA)	4 128.5	(NA)	3 425.9
35441 13	Jigs and fixtures, all types: Gauging and checking types: Less than 1,000 lb weight	(NA)	173.8	234	157.4
35441 15	1,000 lb weight or more	(NA)	45.5	53	48.3
35441 17	All other jigs and fixtures (holding, positioning, layout, assembly, etc.): Less than 1,000 lb weight	(NA)	270.9	440	258.6
35441 18	1,000 lb weight or more	(NA)	162.5	141	330.9
35441 19	Standard catalog components and parts for jigs and fixtures, including drill bushings	(NA)	115.7	35	57.7
35441 21	Dies, metalworking only: Press brake dies	(NA)	30.0	32	23.9
35441 22	Forming and drawing dies: 500 lb weight or less	(NA)	99.4	178	86.6
35441 24	501 to 3,000 lb weight	(NA)	189.6	195	96.6
35441 26	More than 3,000 lb weight	(NA)	301.1	111	212.7
35441 27	Stamping dies, including lamination and blanking dies: Progressive type dies: High speed steel	(NA)	271.0	533	342.5
35441 28	Carbide	(NA)	66.8	108	88.0
35441 25	Other	(NA)	151.1	496	611.1
35441 23	All other stamping type dies (punch, trim, notch, pierce, perforate, etc.)	(NA)	504.2		
35441 33	Forging dies, including cold forging and heading: Open die type	(NA)	41.4	49	26.2
35441 35	Closed die type	(NA)	93.9	80	79.2
35441 43	Extrusion and wiredrawing and straightening dies: High speed steel	(NA)	44.2	62	60.8
35441 45	Carbide	(NA)	33.4	36	31.6
35441 42	Ceramic and ceramic composite	(NA)	1	(*)	(*)
35441 44	Other	(NA)	55.0	(*)	(*)
35441 46	All other dies: High speed steel	(NA)	36.0	67	42.3
35441 47	Carbide	(NA)	47.1	43	40.1
35441 48	Other	(NA)	57.2	*81	*60.8

See footnotes at end of table.

Table 2. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1987 and 1982—Con.

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 product code	Product	1987		1982	
		Number of companies with shipments of \$100,000 or more	Value of product shipments ¹ (million dollars)	Number of companies with shipments of \$100,000 or more	Value of product shipments ¹ (million dollars)
3544--	SPECIAL DIES, TOOLS, JIGS, AND FIXTURES—Con.				
35441 --	Special dies and tools, die sets, jigs, and fixtures—Con.				
	Dies, metalworking only—Con.				
	Standard and special components and parts for dies:				
35441 73	Die sets	(NA)	77.8	43	78.2
	Standard punches:				
35441 75	Steel	(NA)	122.8	60	68.6
35441 77	Carbide	(NA)	8.9	29	11.5
35441 78	Other	(NA)	113.6	57	79.3
35441 83	Industrial models and prototypes	(NA)	225.6	325	350.6
35441 89	Other specially designed tooling	(NA)	333.0		
35441 00	Special dies and tools, die sets, jigs, and fixtures, n.s.k.	(NA)	456.5	(NA)	182.3
35442 --	Industrial molds and mold boxes	(NA)	2 439.0	(NA)	1 800.6
	Industrial molds made of metal:				
	Molds for metal or metal carbides (except ingot molds):				
35442 11	Injection or compression types (die casting dies)	(NA)	251.8	304	213.2
35442 13	Other types	(NA)	35.6	49	40.6
	Molds for wax:				
35442 15	Injection or compression types	(NA)	58.7	81	56.2
35442 16	Other types	(NA)	3.6		
	Molds for mineral materials:				
35442 17	Injection or compression types	(NA)	(⁶)	(7)	(7)
35442 18	Other types	(NA)	625.9		
	Molds for glass:				
35442 19	Injection or compression types	(NA)	105.5	118	104.8
35442 23	Other types	(NA)	2.6		
	Molds for rubber:				
35442 41	Injection or compression types	(NA)	100.2	118	104.8
35442 42	Other types	(NA)	33.1		
	Molds for plastics:				
35442 51	Injection types	(NA)	1 282.9	1 084	1 008.0
35442 55	Compression types, including matched metal molds	(NA)	102.9	118	79.3
35442 59	All other types, including transfer, plunger, and rotational molds	(NA)	109.4	119	68.5
35442 45	Molds for other materials	(NA)	46.2	(7)	(7)
35442 47	Mold bases	(NA)	33.5		
35442 63	Industrial molds made of materials other than metal	(NA)	37.3	40	39.5
35442 67	Mold boxes or flasks for use with patterns and sand molds in foundries	(NA)	7.1	765	7143.2
35442 00	Industrial molds and mold boxes, n.s.k.	(NA)	202.8	(NA)	47.3
35440 --	Special dies, tools, jigs, and fixtures, n.s.k.	(NA)	1 588.9	(NA)	872.8
35440 00	Special dies, tools, jigs, and fixtures, n.s.k., typically for establishments with 10 employees or more (see note)	(NA)	1 181.9	(NA)	501.7
35440 02	Special dies, tools, jigs, and fixtures, n.s.k., typically for establishments with less than 10 employees (see note)	(NA)	407.0	(NA)	371.1
3545--	MACHINE TOOL ACCESSORIES				
	Total	(NA)	3 392.9	(NA)	3 069.1
35451 --	Small cutting tools for machine tools and metalworking machinery	(NA)	1 782.5	(NA)	1 755.7
35451 14	Broaches (excluding holders and burnishing bars)	(NA)	63.1	39	85.9
	Twist drills (excluding combined drills, countersinks, and gun drills):				
	Carbon steel and high speed steel:				
35451 16	1/2 in. or less diameter, taper shank	(NA)	9.8	14	30.7
35451 17	1/2 in. or less diameter, straight shank	(NA)	163.4	24	133.6
35451 18	More than 1/2 in. diameter, taper shank	(NA)	16.4	12	12.6
35451 19	More than 1/2 in. diameter, straight shank	(NA)	26.4	17	31.3
35451 24	Carbide, solid end tipped (excludes tips and blanks sold separately and masonry drills)	(NA)	43.6	25	35.5
35451 22	Masonry drill bits	(NA)	59.5	12	27.6
35451 25	Gun drills and gun reamers	(NA)	11.6	18	22.9
35451 26	Combination drills and countersinks	(NA)	9.8	12	13.2
35451 27	Countersinks, including port cutters, etc. (excluding combined drills and countersinks and pilots for interchangeable pilot types)	(NA)	12.2	18	7.8
35451 29	Counterbores, including spot facers, etc. (excluding pilots for interchangeable pilot types)	(NA)	7.5	31	12.6
	Reamers (all types, but excluding gun reamers):				
35451 32	Carbon steel and high speed steel, including blades sold separately	(NA)	28.7	31	28.5
35451 36	Carbide, solid end tipped (excluding tips and blanks sold separately), including replaceable blades sold separately	(NA)	24.4	33	15.5
35451 42	Hobs, all types	(NA)	(D)	8	32.0
35451 47	Gear shaper cutters and gear shaving cutters	(NA)	43.8	9	35.6
	End mills and milling cutters:				
	End mills, solid and tipped, die-sinking, contour, router, tracer, hollow mills, etc. (excluding inserted blade types and shell mills):				
35451 51	High speed steel	(NA)	86.8	37	92.2
35451 52	Carbide, solid and tipped (excluding blades sold separately)	(NA)	44.3	40	32.1
	Inserted blade type cutters, all types, complete:				
35451 53	Nonindexable	(NA)	7.0	12	7.4
35451 54	Indexable or throwaway insert types	(NA)	20.2	13	15.6
35451 58	Form relieved cutters, including high speed steel and carbide (solid end tipped)	(NA)	5.3	20	16.4
35451 59	Slitting saws and screw slotting cutters, including high speed steel end carbide (solid end tipped)	(NA)	9.2	12	10.9
	Milling cutters, n.e.c.:				
35451 61	High speed steel	(NA)	42.2	19	49.0
35451 63	Carbide, solid end tipped (excluding tips and blanks sold separately)	(NA)	10.9	13	5.7
	Threading tools:				
	Taps (excluding taps in threading sets and screw plates and inserted chaser types):				
35451 77	Carbon steel and carbide	(NA)	5.3	9	7.1

See footnotes at end of table.

Table 2. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1987 and 1982—Con.

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 product code	Product	1987		1982	
		Number of companies with shipments of \$100,000 or more	Value of product shipments ¹ (million dollars)	Number of companies with shipments of \$100,000 or more	Value of product shipments ¹ (million dollars)
3545—	MACHINE TOOL ACCESSORIES—Con.				
35451—	Small cutting tools for machine tools and metalworking machinery—Con.				
	Threading tools—Con.				
	Taps (excluding taps in threading sets and screw plates and inserted chaser types)—Con.				
	High speed steel:				
35451 70	Cut thread	(NA)	2.3	10	22.9
35451 71	Ground thread	(NA)	115.8	23	92.5
35451 73	Dies, with two or more thread-forming edges integral with the body (including round, square, hexagonal, spring, two-piece, and adjustable types) (excluding inserted chaser types and dies sold in threading sets or screw plates)	(NA)	18.1	8	23.1
35451 75	Chasers, single edge thread cutting, circular blade, and tangent types for mounting into or onto holders, die heads, and tap bodies (excluding die heads, tap bodies, and chaser holders)	(NA)	31.9	9	23.1
35451 87	Thread rolling dies, including circular, flat, and planetary	(NA)	34.5	13	29.8
35451 89	Other threading tools, including screw plates and threading sets	(NA)	6.4	11	14.0
	Single and double point tools ² :				
35451 65	High speed steel	(NA)	10.6	27	12.7
35451 66	Carbide, solid and tipped (excluding rough blanks, and tips and blanks sold separately)	(NA)	27.5	45	44.1
35451 68	Other materials	(NA)	18.3	12	11.1
35451 72	Circular form tools, including semifinished blanks	(NA)	43.7	16	29.7
	Blanks, tips, and inserts ³ :				
	Molded blanks and tips (excluding pressed-to-size inserts):				
35451 91	Carbide	(NA)	82.8	28	74.0
35451 93	Other than carbide	(NA)	6.8	8	10.5
	Inserts, indexable and throwaway types:				
	Carbide:				
35451 82	Utility ground	(NA)	45.9	14	85.1
35451 83	Precision ground	(NA)	168.8	42	149.7
35451 84	Pressed to size, including inserts with center holes and with molded chip breakers	(NA)	(D)	13	84.5
35451 95	Ceramic	(NA)	24.6	5	2.9
35451 96	Other than carbide and ceramic	(NA)		7	2.6
	Inserts, other than indexable and throwaway types:				
35451 86	Carbide	(NA)	20.5	15	22.3
35451 97	Ceramic	(NA)	.6	8	7.2
35451 99	Other than carbide and ceramic	(NA)			
	Other types of cutting tools for machine tools, n.e.c., including rotary burs, rotary files, and spade drills:				
35451 92	Carbon steel	(NA)	19.9	32	47.6
35451 94	High speed steel	(NA)	32.2	50	53.2
35451 98	Carbide, solid and tipped (excluding tips and blanks sold separately)	(NA)	60.3	62	52.1
35451 00	Small cutting tools for machine tools and metalworking machinery, n.s.k.	(NA)	164.6	(NA)	99.1
35454—	Attachments and accessories for machine tools and metalworking machinery, n.e.c.	(NA)	478.1	(NA)	593.6
	Tool holders:				
35454 12	Turning tool holders, mechanically clamping for inserts and bits (except box tools and screw machine tool holders)	(NA)	63.8	34	93.1
35454 14	Boring bars and heads	(NA)	25.7	29	49.8
35454 17	Drilling, reaming, and tapping chucks	(NA)	39.6	9	18.8
35454 31	Special tooling and attachments for screw and automatic machines (box tools, tool holders, turrets, rollers, etc.) except standard cutting bits and tools	(NA)	9.4	19	19.3
35454 37	Die heads and tap bodies for chaser type threading and thread-rolling heads (excludes hand type die stocks)	(NA)	10.4	5	5.1
35454 38	Other tool holders, including other chucks, drill heads, tool posts, turrets, sleeves, sockets, etc.	(NA)	62.5	38	74.4
	Work holding devices:				
35454 45	Rotary tables and indexing work holders, including numerically controlled	(NA)	24.8	17	34.7
35454 59	Other work holding and positioning devices, including vises, mandrels, feeding fingers and collets, clamps, stops, face plates, spacers, etc.	(NA)	107.1	80	129.0
	Other attachments and accessories for machine tools and metalworking machinery, etc.:				
35454 41	Tracer and tapering attachments, safety devices, centers, dogs, work rests, chutes, etc. (excluding cutting tools, tool end work holders, jigs, fixtures, dies, and molds)	(NA)	3.9	15	9.1
35454 43	Lathe chucks	(NA)	13.4	7	24.2
35454 51	Tool room specialties, including levels, angle plates, parallels, sine bars, V-blocks, flats, etc.	(NA)	5.2	69	115.5
35454 98	Other attachments and accessories	(NA)	81.3		
35454 00	Attachments and accessories for machine tools and metalworking machinery, n.e.c., n.s.k.	(NA)	30.8	(NA)	20.7
35455—	Precision measuring tools (inspection, quality control, tool room, and machinists')	(NA)	417.2	(NA)	402.7
35455 11	Comparators (excluding optical)	(NA)	6.1	11	26.7
	Fixed size limit gauges (American Gauge Design Type C58-61):				
35455 13	Fixture type	(NA)	22.9	27	18.5
35455 15	Thread type	(NA)	23.3	20	30.9
35455 17	Adjustable size limit gauges	(NA)	14.9	14	15.9
35455 21	Gauge blocks	(NA)	8.5	5	6.6
35455 61	Dial indicators	(NA)	16.1	7	23.1
35455 65	Micrometers and calipers	(NA)	64.9	7	24.8
35455 71	Pneumatic and electronic gauges (manual and automatic)	(NA)	50.5	23	94.9
	Coordinate and contour measuring machines (inspection and gauging) and parts (sold separately):				
	Complete units:				
35455 94	Conventional	(NA)	56.6	12	55.2
35455 95	Numerically controlled	(NA)			

See footnotes at end of table.

Table 2. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1987 and 1982—Con.

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 product code	Product	1987		1982	
		Number of companies with shipments of \$100,000 or more	Value of product shipments ¹ (million dollars)	Number of companies with shipments of \$100,000 or more	Value of product shipments ¹ (million dollars)
3545—	MACHINE TOOL ACCESSORIES—Con.				
35455 —	Precision measuring tools (inspection, quality control, tool room, and machinists')—Con.				
	Coordinate and contour measuring machines (inspection and gauging) and parts (sold separately)—Con.				
35455 96	Parts	(NA)	.4	(10)	(10)
35455 91	Gear checking instruments	(NA)	-		
35455 92	Gear checking machines and parts (sold separately):			10	11.9
35455 93	Complete units	(NA)	(D)		
	Parts	(NA)	(D)		
35455 81	Surface texture measuring machines and parts (sold separately):			1030	1076.3
35455 83	Complete units	(NA)	(11)		
35455 83	Parts	(NA)	117.8		
35455 97	Other machinists' precision measuring tools (including dividers) ..	(NA)	93.3		
35455 98	Parts and accessories for machinists' precision measuring tools (sold separately)	(NA)	21.7		
35455 00	Precision measuring tools, n.s.k.	(NA)	18.7	(NA)	17.9
35450 —	Machine tool accessories, n.s.k.	(NA)	715.2	(NA)	317.0
35450 00	Machine tool accessories, n.s.k., typically for establishments with 10 employees or more (see note)	(NA)	529.6	(NA)	217.7
35450 02	Machine tool accessories, n.s.k., typically for establishments with less than 10 employees (see note)	(NA)	185.6	(NA)	99.3
1987 product code	Product	1987		1982	
		Number of companies with shipments of \$100,000 or more	Product shipments ¹	Number of companies with shipments of \$100,000 or more	Product shipments ¹
			Quantity ² Value (million dollars)		Quantity ² Value (million dollars)
3546—	POWER-DRIVEN HANDTOOLS				
	Total	(NA)	(X) 1 879.8	(NA)	(X) 1 594.8
35461 —	Power-driven handtools, electric (including battery powered)	(NA)	(X) 1 071.0	(NA)	(X) 829.9
	Drills:				
	Armature mounted primarily on sleeve bearings:				
35461 01	1/4 in. (6.35 mm) chuck size or less	(NA)			
35461 03	5/16 in. (7.94 mm) to less than 1/2 in. (12.70 mm)	(NA)	4 926.5	6	3 403.6
35461 04	1/2 in. (12.70 mm) or more	(NA)	132.6		70.9
	Armature mounted primarily on other than sleeve bearings:				
35461 05	1/4 in. (6.35 mm) chuck size or less	(NA)		5	95.2
35461 07	5/16 in. (7.94 mm) to less than 1/2 in. (12.70 mm)	(NA)	1 417.1	7	979.1
35461 09	1/2 in. (12.70 mm) or more	(NA)	668.0	7	339.1
35461 22	Screwdrivers and nut-runners	(NA)	2 601.9	5	147.9
35461 21	Hammers, percussion and rotary, without drill chuck	(NA)	84.7	5	24.6
35461 23	Hammers—drills, with a drill chuck	(NA)	(D)	7	83.0
35461 25	Impact wrenches	(NA)	(D)	8	91.3
35461 28	Shears and nibblers	(NA)	58.6	6	38.0
35461 31	Planers	(NA)		8	871.4
35461 32	Routers	(NA)	801.7		36.6
	Polishers, circular sanders, and grinders (except bench grinders):				
35461 26	Right-angle polishers, circular sanders, and grinders	(NA)	765.2	10	848.7
35461 29	All other polishers, circular sanders, and grinders (including die grinders, but excluding bench)	(NA)	641.2	10	117.2
	Sanders (except circular):				
35461 33	Belt	(NA)	633.7	8	619.8
35461 34	Oscillating, reciprocating, and vibrating	(NA)	1 041.9	7	568.0
	Saws, circular:				
35461 12	Armature mounted primarily on sleeve bearings	(NA)	1 565.5	4	(D)
	Armature mounted primarily on other than sleeve bearings:				
35461 15	7 in. (177.80 mm) blade or less	(NA)		4	26.9
35461 16	More than 7 in. (177.80 mm) to less than 8 in. (203.20 mm) blade	(NA)	1 429.0	6	634.3
35461 17	8 in. (203.20 mm) blade or more	(NA)	82.1	4	28.7
	Saws—jig, saber, reciprocating:				
35461 18	Armature mounted on ball bearings	(NA)	714.3		
35461 19	Armature mounted on other than ball bearings	(NA)	1 415.6	9	1 916.6
35461 37	Chain saws	(NA)	384.0	4	(D)
35461 35	Other electric-powered handtools	(NA)	(S)	18	(S)
35461 36	Parts, attachments, and accessories for electric-powered handtools (sold separately), excluding saw blades, drill bits, screwdrivers, motors, and switches	(NA)	12108.2		13166.6
35461 00	Power-driven handtools, electric (including battery powered), n.s.k.	(NA)	(X) 205.1	20	(X) 209.2
	Power-driven handtools, electric (including battery powered), n.s.k.	(NA)	(X) 5.8	(NA)	(X) 9.9
35462 —	Power-driven handtools, pneumatic, hydraulic, and powder-actuated	(NA)	(X) 493.1	(NA)	(X) 382.4
	Pneumatic:				
35462 38	Drills, screwdrivers, and nut-runners	(NA)	(S) 76.4	15	223.5
35462 37	Percussion tools (such as runners, riveters, chippers, scalers)	(NA)	(S) 24.0	15	(S) 22.7
35462 41	Impact wrenches	(NA)	(S) 40.3	11	253.4
	Grinders, polishers, and sanders:				
35462 42	Rotary	(NA)	(S) 49.3		
35462 44	Other	(NA)	(S) 7.0	14	438.2

See footnotes at end of table.

Table 2. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1987 and 1982—Con.

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1987 product code	Product	1987			1982		
		Number of companies with shipments of \$100,000 or more	Product shipments ¹		Number of companies with shipments of \$100,000 or more	Product shipments ¹	
			Quantity ²	Value (million dollars)		Quantity ²	Value (million dollars)
3546—	POWER-DRIVEN HANDTOOLS—Con.						
35462 —	Power-driven handtools, pneumatic, hydraulic, and powder-actuated—Con.						
35462 47	Pneumatic—Con.						
35462 51	Other pneumatic-powered handtools thousands..	(NA)	(S)	131.1	35	(S)	66.8
	Parts, attachments, and accessories for pneumatic-powered handtools (sold separately), excluding drill bits, screwdrivers, etc.	(NA)	(X)	111.3	24	(X)	110.3
35462 61	Powder-actuated handtools thousands..	(NA)	(S)	(¹⁴)	12	(S)	30.3
35462 71	Hydraulic:						
35462 72	Chain saws, including pole thousands..	(NA)	(S)	147.9			
35462 79	Other hydraulic-powered handtools do..	(NA)	(S)	22.4			
	Parts, attachments, and accessories for powder-actuated and hydraulic handtools (sold separately) (excluding saw blades, drill bits, etc.)	(NA)	(X)	12.8	6	(X)	8.3
35462 00	Power-driven handtools, pneumatic, hydraulic, and powder-actuated, n.s.k.	(NA)	(X)	10.7	(NA)	(X)	5.3
35463 —	Power-driven handtools, engine (internal combustion) driven	(NA)	(X)	213.7	(NA)	(X)	326.5
35463 01	Chain saws thousands..	(NA)	(S)	162.1	6	3 123.8	211.5
35463 11	Other, including cut-off saws and drills do..	(NA)	(D)	(¹⁵)	4	(S)	12.6
	Parts, attachments, and accessories for engine-driven handtools, sold separately (excluding saw blades, drill bits, engines, engine parts, etc.):						
35463 12	For chain saws thousands..	(NA)	(X)	¹⁵ 39.9	10	(X)	99.3
35463 14	For other than chain saws do..	(NA)	(X)	8.1			
35463 00	Power-driven handtools, engine (internal combustion) driven, n.s.k.	(NA)	(X)	3.6	(NA)	(X)	3.2
35460 —	Power-driven handtools, n.s.k.	(NA)	(X)	101.9	(NA)	(X)	56.0
35460 00	Power-driven handtools, n.s.k., typically for establishments with 10 employees or more (see note)	(NA)	(X)	37.7	(NA)	(X)	25.0
35460 02	Power-driven handtools, n.s.k., typically for establishments with less than 10 employees (see note)	(NA)	(X)	64.2	(NA)	(X)	31.0

1987 product code	Product	1987		1982	
		Number of companies with shipments of \$100,000 or more	Value of product shipments ¹ (million dollars)	Number of companies with shipments of \$100,000 or more	Value of product shipments ¹ (million dollars)
3547—	ROLLING MILL MACHINERY				
	Total	(NA)	403.1	(NA)	445.1
35471 —	Hot rolling mill machinery, including combination hot and cold (except tube rolling)	(NA)	175.3	(NA)	180.5
35471 11	Blooming and slabbing mill machinery	(NA)		5	(¹⁶)
35471 13	Plate rolling mill machinery, except tin plate machinery	(NA)	31.6	3	4.8
35471 17	Hot strip mill machinery	(NA)		3	¹⁶ 66.4
35471 18	Other hot rolling mill machinery and equipment	(NA)	141.0	10	94.6
35471 00	Hot rolling mill machinery, including combination hot and cold (except tube rolling), n.s.k.	(NA)	2.6	(NA)	14.7
35472 —	Cold rolling mill machinery	(NA)	67.2	(NA)	65.1
35472 21	Tandem roll mills	(NA)	11.3	5	5.9
35472 23	Single stand roll mills	(NA)	8.2	5	15.6
35472 27	Double stand roll mills	(NA)	44.2	11	41.2
35472 28	Other cold rolling mill machinery and equipment	(NA)			
35472 00	Cold rolling mill machinery, n.s.k.	(NA)	3.5	(NA)	2.3
35473 —	Rolling mill machinery, n.e.c. (including tube mill machinery) and parts for all rolling mill machinery	(NA)	137.0	(NA)	188.2
35473 35	Tube mill machinery	(NA)	21.3	14	95.7
35473 47	Processing lines, including pickling and cleaning, tinning, galvanizing, etc.	(NA)	(¹⁷)		
35473 48	Other rolling mill machinery and equipment, excluding parts	(NA)	¹⁷ 49.1	16	91.3
35473 51	Machined rolls for rolling mills	(NA)	47.1		
35473 52	Parts, excluding rolls, for rolling mill machinery (sold separately)	(NA)	16.9		
35473 00	Rolling mill machinery, n.e.c. (including tube mill machinery) and parts for all rolling mill machinery, n.s.k.	(NA)	2.7	(NA)	1.2
35470 —	Rolling mill machinery, n.s.k.	(NA)	23.6	(NA)	11.4
35470 00	Rolling mill machinery, n.s.k., typically for establishments with 10 employees or more (see note)	(NA)	10.8	(NA)	2.3
35470 02	Rolling mill machinery, n.s.k., typically for establishments with less than 10 employees (see note)	(NA)	12.8	(NA)	9.1

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1987 product code	Product	1987			1982		
		Number of companies with shipments of \$100,000 or more	Product shipments ¹		Number of companies with shipments of \$100,000 or more	Product shipments ¹	
			Quantity ²	Value (million dollars)		Quantity ²	Value (million dollars)
3548—	WELDING APPARATUS						
	Total	(NA)	(X)	1 921.9	(NA)	(X)	1 606.6
35481 —	Arc welding machines, components, and accessories, except electrodes (excluding stud welding equipment)	(NA)	(X)	603.3	(NA)	(X)	511.6
	Arc welding machines:						
	Alternating current transformer arc welders:						
35481 01	300 amps or less	(NA)	**183.4	37.2	9	(S)	27.1
35481 02	More than 300 amps	(NA)	(S)	(¹⁸)	10	*1.0	20.8
	Direct current arc welders:						
35481 03	Generators only	(NA)	(S)	(¹⁸)	11	(S)	137.7
35481 04	Rectifier types, including ac/dc	(NA)	(S)	144.1			
	Complete units only:						
35481 05	Engine driven	(NA)	41.7	78.5	5	41.1	79.6
35481 06	Motor driven	(NA)	(S)	¹⁸ 104.8	4	4.3	5.5
	Components and accessories for arc welding machines (except electrodes):						
35481 07	Automatic and semiautomatic wire drive apparatus and related accessories	(NA)	(X)	36.5	12	(X)	37.8
35481 08	Special purpose automatic welding apparatus	(NA)	(X)	16.3	12	(X)	14.5
35481 09	Automatic and semiautomatic welding torches, guns and cables, and related accessories	(NA)	(X)	57.4	13	(X)	50.8
35481 11	Circuit welding accessories (including electrode holders, ground clamps, cable connectors, cables sold separately, etc.)	(NA)	(X)	23.0	7	(X)	22.6
35481 12	Positioning and manipulating equipment (including turn rolls, head-and-tail stock, weld head manipulators, seamers, moving carriages, etc.)	(NA)	(X)	21.1	15	(X)	34.1
35481 19	All other components and accessories for arc welding machinery, excluding welding rods and electrodes	(NA)	(X)	52.0	21	(X)	73.9
35481 00	Arc welding machines, components, and accessories, except electrodes (excluding stud welding equipment), n.s.k.	(NA)	(X)	32.4	(NA)	(X)	7.2
35482 —	Arc welding electrodes, metal	(NA)	(X)	509.6	(NA)	(X)	469.6
	Stick electrodes (including solid, cored, covered, and bare electrodes):						
	Hard facing:						
35482 01	Manual coated	(NA)	(S)	14.2	11	(¹⁹)	(¹⁹)
35482 02	Bare rod for oxy-acetylene applications, TIG	(NA)					
	Other than hard facing:						
35482 03	Mild steel	(NA)	*266.2	134.6	10	371.9	180.3
35482 04	Low alloy steel	(NA)					
35482 05	Stainless steel (chromium, 4 percent or more)	(NA)	20.9	23.9	11	15.9	11.0
35482 06	Nonferrous	(NA)					
	Coiled and spooled continuous wire electrodes for automatic arc welding and inert gas shielded arc welding (including electrodes for submerged arc welding, base wire):		2.6	19.2	3	¹⁹ 39.8	¹⁹ 44.6
	Hard facing:						
35482 07	Flux-cored and solid wire, self shielded and gas shielded, 7/64 in. or less	(NA)	(S)	47.9	(NA)	(²⁰)	(²⁰)
35482 08	Flux-cored and solid wire, submerged arc welding (saw), 1/8 in. or more	(NA)					
	Other than hard facing:						
	Solid wire:						
35482 11	Mild steel	(NA)	214.6	102.5	6	107.3	67.2
35482 12	Low alloy steel	(NA)	*11.4	13.2	3	(²⁰)	(²⁰)
35482 13	Stainless steel (chromium, 4 percent or more)	(NA)	(S)	40.4	5	9.6	23.2
35482 14	Nonferrous	(NA)					
	Cored wire:						
35482 15	Mild steel	(NA)	82.2	63.5	11	²⁰ 109.7	²⁰ 95.8
35482 16	Low alloy	(NA)	3.6	3.7			
35482 00	Arc welding electrodes, metal, n.s.k.	(NA)	(X)	46.4	(NA)	(X)	14.8
35483 —	Resistance welders, components, accessories, and electrodes	(NA)	(X)	304.0	(NA)	(X)	187.8
	Resistance welders:						
35483 05	Spot and projection welders, single electrode	(NA)	(S)	23.1	21	(S)	24.3
35483 06	Spot and projection welders, multielectrode	(NA)	(S)	123.0	17	**1.1	74.8
35483 07	Seam welders	(NA)	(S)	19.2	8	.2	11.7
35483 08	Other resistance welders, including flash, upset, and butt welders	(NA)	(S)	13.1	13	(S)	39.2
35483 09	Resistance welder transformers (sold separately)	(NA)	(S)	16.2	6	*8.3	7.5
35483 11	Resistance welder electrodes	(NA)	(S)	11.0	17	(NA)	20.6
35483 19	Resistance welder components and accessories, including electrode holders, etc.	(NA)	(X)	55.1			
35483 00	Resistance welders, components, accessories, and electrodes, n.s.k.	(NA)	(X)	43.1	(NA)	(X)	9.6
35484 —	Gas welding and cutting equipment, except plasma (including parts, attachments, and accessories)	(NA)	(X)	202.4	(NA)	(X)	226.6
35484 01	Torches, welding or cutting	(NA)	(S)	37.7	15	(S)	67.4
35484 02	Cutting machines and carriages, stationary and portable	(NA)	**2.8	38.4	9	(S)	28.5
35484 03	Other gas welding and cutting equipment, excluding pressure containers	(NA)	(X)	29.4	5	(X)	19.0
	Spare parts, accessories, attachments, adaptors, etc., n.e.c., sold separately:						
35484 04	Tips	(NA)	(X)	24.3	13	(X)	35.9
35484 05	Regulators, gas pressure	(NA)	(S)	34.4	11	(S)	31.7
35484 09	All other	(NA)	(X)	26.2	14	(X)	41.1
35484 00	Gas welding and cutting equipment, except plasma (including parts, attachments, and accessories), n.s.k.	(NA)	(X)	12.1	(NA)	(X)	2.9

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[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendix. For meaning of abbreviations and symbols, see introductory text.]

1987 product code	Product	1987				1982			
		Number of companies with shipments of \$100,000 or more	Product shipments ¹		Value (million dollars)	Number of companies with shipments of \$100,000 or more	Product shipments ¹		Value (million dollars)
			Quantity ²				Quantity ²		
3548—	WELDING APPARATUS—Con.								
35485 —	Other welding equipment, components, and accessories (excluding arc, resistance, and gas)	(NA)	(X)		²¹ 181.6	(NA)	(X)		²¹ 148.4
35485 01	Stud welding equipment	(NA)	(S)		21.3	5	(S)		14.7
35485 03	Friction welding equipment	(NA)	(S)			4	(S)		12.2
35485 04	Plasma welding and cutting equipment	(NA)	(S)		93.9	9	(S)		34.1
35485 05	All other welding equipment	(NA)	(X)		²¹ 14.0	12	(X)		²¹ 11.9
35485 07	Soldering equipment (except hand and ultrasonic)	(NA)	(S)		23.4	7	(S)		17.3
35485 09	Components and accessories for all other welding equipment, excluding arc welders, resistance welders, and gas welding and cutting equipment	(NA)	(X)		21.3	13	(X)		58.2
35485 00	Other welding equipment, components, and accessories (excluding arc, resistance, and gas), n.s.k.	(NA)	(X)		7.7	(NA)	(X)		—
35480 —	Welding apparatus, n.s.k.	(NA)	(X)		121.0	(NA)	(X)		²² 62.7
35480 00	Welding apparatus, n.s.k., typically for establishments with 10 employees or more (see note)	(NA)	(X)		74.6	(NA)	(X)		²² 43.7
35480 02	Welding apparatus, n.s.k., typically for establishments with less than 10 employees (see note)	(NA)	(X)		46.3	(NA)	(X)		²² 19.0
3549—	METALWORKING MACHINERY, N.E.C.								
	Total	(NA)	(X)		1 004.8	(NA)	(X)		780.2
35492 —	Assembly machines	(NA)	(X)		510.5	(NA)	(X)		367.6
35492 11	Rotary transfer (dial or rotary, trunnion, center column)	(NA)	(S)		54.0	23	(S)		29.2
35492 15	In-line transfer, synchronous	(NA)	(S)		37.6	19	(S)		53.9
35492 17	In-line transfer, nonsynchronous	(NA)	(S)		103.9	13	(S)		119.7
35492 13	Special purpose and other types	(NA)	(S)		250.4				
35492 18	Parts and attachments for assembly machines (sold separately)	(NA)	(X)		14.9	48	(S)		140.8
35492 00	Assembly machines, n.s.k.	(NA)	(X)		49.7	(NA)	(X)		24.0
35495 —	Metalworking machinery (except handheld and ultrasonic), n.e.c.	(NA)	(X)		332.5	(NA)	(X)		313.0
	Machines for weaving and other wire fabricating and wiredrawing machines and draw benches:								
35495 01	Draw benches and wiredrawing machines (except dies)	(NA)	(X)		18.1				
35495 02	Wire rope or wire cable making machines	(NA)	(X)		15.3	38	(X)		86.3
35495 03	Other machines for working wire	(NA)	(X)		55.8				
35495 43	Coil handling equipment (conversion or straightening):								
35495 45	Cut-to-length lines	(NA)	(X)		56.9	18	(X)		63.4
35495 92	Sitting lines	(NA)	(X)		16.4	9	(X)		26.7
35495 95	Other metalworking machinery	(NA)	(X)		124.6				
35495 00	Parts and attachments for other metalworking machinery (sold separately)	(NA)	(X)		23.1	63	(X)		117.2
35495 00	Metalworking machinery (except handheld and ultrasonic), n.e.c., n.s.k.	(NA)	(X)		22.5	(NA)	(X)		19.4
35490 —	Metalworking machinery, n.e.c., n.s.k.	(NA)	(X)		161.7	(NA)	(X)		²² 99.6
35490 00	Metalworking machinery, n.e.c., n.s.k., typically for establishments with 10 employees or more (see note)	(NA)	(X)		137.3	(NA)	(X)		²² 79.8
35490 02	Metalworking machinery, n.e.c., n.s.k., typically for establishments with less than 10 employees (see note)	(NA)	(X)		24.4	(NA)	(X)		²² 19.8

Note: In 1987 Census of Manufactures, data for establishments of small single unit companies with up to 20 employees were estimated from administrative-record data rather than data actually collected from respondents. Employment cutoffs used for administrative records for each industry and shipments figures are included in code ending with "002". In both 1987 and 1982 Censuses of Manufactures, products not completely identified on standard forms were coded in appropriate product class (five-digit) followed by "00" or to appropriate product group code (four-digit) followed by "000".

¹Data reported by all producers, not just those with shipments of \$100,000 or more.

²For some establishments, data have been estimated from central unit values which are based on quantity-value relationships of reported data. The following symbols are used when percentage of each quantity figure estimated in this manner equals or exceeds 10 percent of published figure: * 10 to 19 percent estimated; ** 20 to 29 percent estimated. If 30 percent or more is estimated, figure is replaced by (S).

³For 1987, data for product code 35419 21 are combined with product code 35419 26 to avoid disclosing data for individual companies.

⁴For 1987, data for product code 35424 03 are combined with product code 35424 05 to avoid disclosing data for individual companies.

⁵For 1982, data for product codes 35441 42 and 35441 44 were not published separately but were included with product code 35441 48.

⁶For 1987, data for product codes 35442 17 and 35442 18 are combined to avoid disclosing data for individual companies.

⁷For 1982, data for product codes 35442 17, 35442 18, 35442 19, 35442 23, 35442 45 and 35442 47 were not published separately but were included with product code 35442 67.

⁸Single point tools are one-piece single point of multiple point tool bits with integral cutting edges or with cutting tips brazed or bonded to holder or shank; with square, rectangular, round, and other cross-section shanks; and with single and double end, including flat form and dovetail tools used for turning, planing, boring, shaping, shaving, forming, threading, cutting off, etc.; excluding circular form tools, and all mechanical holding devices and replaceable inserts.

⁹Blanks are cast or formed material, unground, and requiring further processing to make a solid tool or cutting tip. (Does not include components pressed to size, as molded ready-to-use inserts.) Tips are finished or semifinished form of blank to be brazed, soldered, or otherwise bonded to a shank to form a cutting tool. Inserts are replaceable, mechanically-held-cutting-edge components of cutting tools, either pressed to size, or ground on all surfaces (precision ground), or ground on top and bottom only (utility ground).

¹⁰For 1982, data for product code 35455 96 were not published separately but were included with product codes 35455 93, 35455 81, 35455 83, 35455 97 and 35455 98.

¹¹For 1987, data for product codes 35455 81 and 35455 83 are combined to avoid disclosing data for individual companies.

¹²For 1987, data for product codes 35461 23 and 35461 25 are combined with product code 35461 35 to avoid disclosing data for individual companies.

¹³For 1982, data for product codes 35461 12 and 35461 37 were combined with product code 35461 35 to avoid disclosing data for individual companies.

¹⁴For 1987, data for product code 35462 61 are combined with product code 35462 71 to avoid disclosing data for individual companies.

¹⁵For 1987, data for product code 35463 11 are combined with product code 35463 12 to avoid disclosing data for individual companies.

¹⁶For 1982, data for product code 35471 11 were combined with product code 35471 17 to avoid disclosing data for individual companies.

¹⁷For 1987, data for product code 35473 47 are combined with product code 35473 48 to avoid disclosing data for individual companies.

¹⁸For 1987, data for product codes 35481 02 and 35481 03 are combined with product code 35481 06 to avoid disclosing data for individual companies.

¹⁹For 1982, data for product codes 35482 01 and 35482 02 were combined with product code 35482 06 to avoid disclosing data for individual companies.

²⁰For 1982, data for product code 35482 12 were combined with product codes 35482 15 and 35482 16 to avoid disclosing data for individual companies. For 1982, data for product codes 35482 07 and 35482 08 were not collected separately but were included with product codes 35482 15 and 35482 16.

²¹For 1987, data for induction welding equipment are not collected separately but are included with product code 35485 05. For 1982, data for induction welding equipment were included with product code 36997 00. Electron beam welding equipment was reclassified to industry 3699, Electrical Equipment and Supplies, N.E.C. For 1982, data for induction welding equipment were combined with electron beam welding equipment to avoid disclosing data for individual companies.

²²For 1982, data for product codes 35480 00 and 35480 02 included only electric welding apparatus. For 1982, data for product codes 35490 00 and 35490 02 included nonelectric welding equipment.

Table 3. Materials Consumed by Kind: 1987 and 1982

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 material code	Material	1987		1982	
		Quantity ¹	Delivered cost (million dollars)	Quantity ¹	Delivered cost (million dollars)
INDUSTRY 3541, MACHINE TOOLS, METAL CUTTING TYPES					
	Materials, parts, containers, and supplies	(X)	1 172.5	(X)	1 380.0
Mill shapes and forms, except castings and forgings:					
Carbon steel:					
331011	Bars and bar shapes 1,000 s tons..	(S)	17.5	(S)	35.1
331012	Sheet and strip do..	(S)	8.9	(S)	9.2
331013	Plates do..	(S)	6.6	(S)	13.1
331015	Structural shapes do..	(S)	1.9	(S)	9.1
331017	Wire and wire products do..	(S)		(S)	
331019	All other carbon steel mill shapes and forms do..	(S)	11.7	(S)	3.2
Alloy steel, except stainless:					
331021	Bars and bar shapes 1,000 s tons..	(S)	6.3	(S)	15.1
331029	All other alloy steel mill shapes and forms do..	(S)	2.8	(S)	3.7
331031	Stainless steel do..	(S)	.9	(S)	1.6
335004	Copper and copper-base alloy mil lb..	(S)	.3	(S)	2.0
Aluminum and aluminum-base alloy:					
335301	Sheet, plate, and foil mil lb..	(S)	1.8	(S)	1.8
335405	Extruded shapes, including extruded rod, bar, pipe, tube, etc. do..	(S)	1.3	(S)	1.0
335008	All other aluminum mill shapes and forms (wire, rolled rod and bar, powder, welded tubing, etc.) do..	(S)	.6	(S)	.6
335609	Nonferrous metal mill shapes and forms (except copper and aluminum) do..	(S)	.2	(S)	1.4
335792	Insulated copper wire and cable, except magnet wire (quantity of copper content) do..	(S)	3.4	(S)	6.2
329101	Grinding wheels and other abrasive products, except industrial diamonds do..	(X)	5.6	(X)	10.0
190023	Iron and steel scrap, excluding home scrap 1,000 s tons..	(S)	2.1	(S)	2.3
Castings (rough and semifinished):					
332011	Iron (gray and malleable) 1,000 s tons..	(S)	42.7	(S)	88.0
332045	Steel do..	(S)	12.6	(S)	54.6
336005	Aluminum and aluminum-base alloy mil lb..	(S)	2.9	(S)	3.0
336006	Copper and copper-base alloy do..	(S)	.5	(S)	1.2
336008	Other nonferrous do..	(S)	1.3	(D)	(3)
346200	Iron and steel forgings 1,000 s tons..	(S)	3.1	(S)	15.4
349271	Fluid power (hydraulic and pneumatic) valves do..	(X)	10.3	(X)	11.3
349261	Fluid power (hydraulic and pneumatic) hose or tube fittings and assemblies do..	(X)	3.4	(X)	5.9
Electric motors and generators:					
Fractional horsepower electric motors (less than 1 hp):					
362110	Timing motors, synchronous and subsynchronous thousands..	(S)	22.6	(S)	21.7
362115	Other fractional horsepower electric motors (less than 1 hp) (excluding timing motors) do..	(S)	9.5	(S)	5.1
362120	Integral horsepower motors and generators (1 hp and larger) do..	(S)	24.5	(S)	35.1
Bearings, including mounted and unmounted:					
356218	Ball do..	(X)	12.8	(X)	17.6
356201	Roller do..	(X)	4.1	(X)	8.3
356601	Speed changers, gears, and industrial high-speed drives do..	(X)	3.7	(X)	17.4
Pumps (complete assemblies):					
359412	Hydraulic fluid power pumps, motors, and hydrostatic transmissions thousands..	(S)	7.3	(S)	10.6
356102	Other pumps do..	(S)	1.6	(S)	1.3
356301	Air and gas compressors do..	(S)	.5	(S)	1.1
356921	Filters for hydraulic fluid power systems do..	(X)	2.1	(X)	2.1
359301	Fluid power (hydraulic and pneumatic) cylinders and rotary actuators do..	(X)	3.4	(X)	6.1
359302	Hydraulic and pneumatic equipment (except pumps, compressors, cylinders, and rotary actuators) do..	(X)	4.0	(X)	13.9
360101	Electric transmission, distribution, and control equipment do..	(X)	24.2	(X)	33.2
265001	Paperboard containers, boxes, and corrugated paperboard .. 1,000 s tons..	(S)	1.1	(S)	1.2
305201	Rubber and plastics hose and belting do..	(X)	2.2	(X)	2.3
345001	Bolts, nuts, screws, washers, rivets, and screw machine products do..	(X)	9.1	(X)	16.0
354501	Cutting tools for machine tools do..	(X)	13.9	(X)	36.1
362001	Electrical industrial capacitors, resistors, rheostats, and coil windings do..	(X)	11.1	(X)	20.9
362520	Numerical controls for metalworking machinery (except programmable) do..	(X)	35.6	(X)	34.2
362521	Programmable controllers for metalworking machinery do..	(X)	28.7	(X)	83.4
970099	All other materials and components, parts, containers, and supplies do..	(X)	396.0	(X)	3445.2
971000	Materials, parts, containers, and supplies, n.s.k. ² do..	(X)	405.8	(X)	272.5
INDUSTRY 3542, MACHINE TOOLS, METAL FORMING TYPES					
	Materials, parts, containers, and supplies	(X)	551.3	(X)	512.8
Mill shapes and forms, except castings and forgings:					
Carbon steel:					
331011	Bars and bar shapes 1,000 s tons..	(S)	11.4	(S)	18.9
331012	Sheet and strip do..	(S)	2.8	(S)	1.8
331013	Plates do..	(S)	21.0	**52.5	26.7
331015	Structural shapes do..	(S)	3.2	(S)	4.6
331017	Wire and wire products do..	(S)	.6	(S)	1.8
331019	All other carbon steel mill shapes and forms do..	(S)	4.5	(S)	4.2
Alloy steel, except stainless:					
331021	Bars and bar shapes 1,000 s tons..	(S)	2.9	(S)	7.1
331029	All other alloy steel mill shapes and forms do..	(S)	2.6	(S)	.4
331031	Stainless steel do..	(S)	.7	(S)	.8
335004	Copper and copper-base alloy mil lb..	**9	1.9	(S)	19.0

See footnotes at end of table.

Table 3. **Materials Consumed by Kind: 1987 and 1982—Con.**

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 material code	Material	1987		1982	
		Quantity ¹	Delivered cost (million dollars)	Quantity ¹	Delivered cost (million dollars)
INDUSTRY 3542, MACHINE TOOLS, METAL FORMING TYPES—Con.					
Mill shapes and forms, except castings and forgings—Con.					
Aluminum and aluminum-base alloy:					
335301	Sheet, plate, and foil	(S)	2.6	(S)	5
335405	Extruded shapes, including extruded rod, bar, pipe, tube, etc.	(S)	1.5	(S)	(Z)
335008	All other aluminum mill shapes and forms (wire, rolled rod and bar, powder, welded tubing, etc.)	(S)	.3	(S)	(Z)
335609	Nonferrous metal mill shapes and forms, except copper and aluminum	(S)	.1	(D)	(?)
335792	Insulated copper wire and cable, except magnet wire (quantity of copper content)	(S)	2.0	(S)	1.2
329101	Grinding wheels and other abrasive products, except industrial diamonds	(X)	1.7	(X)	1.5
190023	Iron and steel scrap, excluding home scrap	(S)	.9	(S)	.3
Castings (rough and semifinished):					
332011	Iron (gray and malleable)	(S)	17.3	(S)	27.0
332045	Steel	(S)	6.7	(S)	18.8
336005	Aluminum and aluminum-base alloy	(S)	.6	(S)	2.4
336006	Copper and copper-base alloy	(S)	1.8	(S)	2.9
336008	Other nonferrous	(S)	.2	(S)	.4
346200	Iron and steel forgings	(S)	5.4	(S)	13.8
349271	Fluid power (hydraulic and pneumatic) valves	(X)	5.1	(X)	3.5
349261	Fluid power (hydraulic and pneumatic) hose or tube fittings and assemblies	(X)	4.3	(X)	.9
Electric motors and generators:					
Fractional horsepower electric motors (less than 1 hp):					
362110	Timing motors, synchronous and subsynchronous	(S)	3.4	(S)	3.0
362115	Other fractional horsepower electric motors (less than 1 hp) (excluding timing motors)	(S)	.5	(S)	2.1
362120	Integral horsepower motors and generators (1 hp and larger)	(S)	9.1	(S)	6.7
Bearings, including mounted and unmounted:					
356218	Ball	(X)	4.2	(X)	3.2
356201	Roller	(X)	4.7	(X)	6.3
356601	Speed changers, gears, and industrial high-speed drives	(X)	4.8	(X)	5.7
Pumps (complete assemblies):					
359412	Hydraulic fluid power pumps, motors, and hydrostatic transmissions	(S)	7.9	(S)	6.6
356102	Other pumps	(S)	.9	(S)	.4
356301	Air and gas compressors	(S)	.5	(D)	(?)
356921	Filters for hydraulic fluid power systems	(X)	.2	(X)	.4
359301	Fluid power (hydraulic and pneumatic) cylinders and rotary actuators	(X)	9.3	(X)	3.5
359302	Hydraulic and pneumatic equipment (except pumps, compressors, cylinders, and rotary actuators)	(X)	3.8	(X)	3.8
360101	Electric transmission, distribution, and control equipment	(X)	9.5	(X)	6.2
265001	Paperboard containers, boxes, and corrugated paperboard ..	(X)	.7	(S)	.7
305201	Rubber and plastics hose and belting	(X)	1.7	(X)	.5
345001	Bolts, nuts, screws, washers, rivets, and screw machine products	(X)	5.8	(X)	4.3
354501	Cutting tools for machine tools	(X)	6.1	(X)	4.0
362001	Electrical industrial capacitors, resistors, rheostats, and coil windings	(X)	6.1	(X)	.9
362520	Numerical controls for metalworking machinery (except programmable)	(X)	1.7	(X)	1.9
362521	Programmable controllers for metalworking machinery	(X)	10.5	(X)	6.1
970099	All other materials and components, parts, containers, and supplies	(X)	108.6	(X)	³ 140.6
971000	Materials, parts, containers, and supplies, n.s.k. ²	(X)	249.0	(X)	149.8
INDUSTRY 3543, INDUSTRIAL PATTERNS					
Materials, parts, containers, and supplies		(X)	90.9	(X)	74.1
Mill shapes and forms, except castings and forgings:					
331001	Carbon steel	(S)	.7	(S)	1.7
331020	Alloy steel, except stainless	(S)	.4	*1.0	1.0
331031	Stainless steel	(S)	.2	**5	1.6
335105	Copper and copper-base alloy	(Z)	(Z)	*9	1.3
335001	Aluminum and aluminum-base alloy	(S)	1.1	**2.2	2.3
Castings (rough and semifinished):					
332011	Iron (gray and malleable)	(S)	4.8	(S)	5.0
332045	Steel	(S)	1.6	(S)	3.5
336005	Aluminum and aluminum-base alloy	(S)	2.0	(S)	3.7
336006	Copper and copper-based alloy	(S)	.1	*1.0	1.3
336008	Other nonferrous	(S)	.1	2.2	1.1
242101	Rough and dressed lumber	(S)	1.5	**8.9	6.8
308007	Plastics products consumed in the form of sheets, rods, tubes, and other shapes	(X)	.6	(X)	3.1
970099	All other materials and components, parts, containers, and supplies consumed	(X)	20.4	(X)	8.4
971000	Materials, parts, containers, supplies, n.s.k. ²	(X)	57.2	(X)	33.3
INDUSTRY 3544, SPECIAL DIES, TOOLS, AND JIGS AND FIXTURES					
Materials, parts, containers, and supplies		(X)	1 623.5	(X)	1 131.6

See footnotes at end of table.

Table 3. **Materials Consumed by Kind: 1987 and 1982—Con.**

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 material code	Material	1987		1982	
		Quantity ¹	Delivered cost (million dollars)	Quantity ¹	Delivered cost (million dollars)
INDUSTRY 3544, SPECIAL DIES, TOOLS, AND JIGS AND FIXTURES—Con.					
Mill shapes and forms, except castings and forgings:					
Carbon steel:					
331011	Bars and bar shapes ----- 1,000 s tons..	(S)	74.6	(S)	52.3
331012	Sheet and strip ----- do..	(S)	31.7	(S)	17.0
331013	Plates ----- do..	(S)	39.0	(S)	48.1
331015	Structural shapes ----- do..	(S)	6.0	(S)	7.3
331017	Wire and wire products ----- do..	(S)	1.1	(S)	.4
331019	All other carbon steel mill shapes and forms ----- do..	(S)	13.0	(S)	9.0
Alloy steel, except stainless:					
331021	Bars and bar shapes ----- 1,000 s tons..	(S)	88.7	(S)	60.5
331029	All other alloy steel mill shapes and forms ----- do..	(S)	39.2	(S)	18.6
Stainless steel:					
331033	Sheet and strip ----- 1,000 s tons..	(S)	6.4	(S)	5.0
331050	All other stainless steel mill shapes and forms ----- do..	(S)	17.8	(S)	7.4
Copper and copper-base alloy:					
335102	Rod, bar, and mechanical wire, including extruded and/ or drawn shapes ----- mil lb..	(S)	2.5	(S)	1.9
335143	Plate, sheet, and strip, including military cups and discs ----- do..	(S)	6.3	(S)	4.8
335003	All other ----- do..	(S)	.3	(S)	4.8
Aluminum and aluminum-base alloy:					
335301	Sheet, plate, and foil ----- mil lb..	(S)	13.8	(S)	7.7
335405	Extruded shapes, including rod, bar, pipe, tube, etc. ----- do..	(S)	5.7	(S)	3.4
335008	All other aluminum mill shapes and forms (wire, rolled rod and bar, powder, welded tubing, etc.) ----- do..	(S)	2.4	(S)	1.1
335609	Nonferrous metal mill shapes and forms, except copper and aluminum -----	(X)	1.2	(X)	.9
329903	Industrial diamonds ----- carats..	(S)	4.6	(S)	3.0
Metal powders:					
339916	Tungsten carbide ----- mil lb..	(S)	14.5	(S)	14.7
339919	All other ----- do..	**3	3.0	**5	3.3
190023	Iron and steel scrap, excluding home scrap ----- 1,000 s tons..	(S)	14.9	**3.8	1.2
Castings (rough and semifinished):					
332011	Iron (gray and malleable) ----- 1,000 s tons..	(S)	17.8	(S)	28.0
332045	Steel ----- do..	(S)	10.9	(S)	7.9
336005	Aluminum and aluminum-base alloy ----- mil lb..	(S)	5.5	(S)	4.9
336006	Copper and copper-base alloy ----- do..	(S)	7.8	(S)	4.0
336008	Other nonferrous ----- do..	(S)	28.0	(S)	2.7
346200	Iron and steel forgings ----- 1,000 s tons..	(S)	2.9	**1.4	2.4
Bearings, including mounted and unmounted:					
356218	Ball -----	(X)	1.8	(X)	.7
356201	Roller -----	(X)	.9	(X)	.4
359411	Hydraulic and pneumatic equipment, including pumps and compressors -----	(X)	8.8	(X)	4.7
360101	Electric transmission, distribution, and control equipment -----	(X)	17.4	(X)	2.9
329101	Grinding wheels and other abrasive products, except industrial diamonds -----	(X)	12.2	(X)	9.0
345001	Bolts, nuts, screws, washers, rivets, and screw machine products -----	(X)	24.1	(X)	10.1
280020	Ceramic raw materials, including powders, chemicals, and fibers, excluding refractory uses -----	(X)	1.3	(X)	(⁹)
320601	Ceramic and ceramic composite parts, components, and accessories -----	(X)	.5	(X)	(⁹)
970099	All other materials and components, parts, containers, and supplies -----	(X)	280.0	(X)	5206.2
971000	Materials, parts, containers, and supplies, n.s.k. ² -----	(X)	817.0	(X)	579.3
INDUSTRY 3545, MACHINE TOOL ACCESSORIES					
Materials, parts, containers, and supplies -----		(X)	789.0	(X)	778.8
Mill shapes and forms, except castings and forgings:					
Carbon steel:					
331011	Bars and bar shapes ----- 1,000 s tons..	(S)	51.7	(S)	37.1
331012	Sheet and strip ----- do..	(S)	1.5	(S)	1.5
331013	Plates ----- do..	(S)	2.4	(S)	3.7
331015	Structural shapes ----- do..	(S)	1.3	(S)	1.5
331017	Wire and wire products ----- do..	(S)	4.3	(S)	4.7
331019	All other carbon steel mill shapes and forms ----- do..	(S)	6.7	(S)	10.1
Alloy steel, except stainless:					
331021	Bars and bar shapes ----- 1,000 s tons..	(S)	103.8	(S)	119.4
331029	All other alloy steel mill shapes and forms ----- do..	(S)	14.1	(S)	20.1
Stainless steel:					
331033	Sheet and strip ----- 1,000 s tons..	(S)	1.5	*7	1.8
331050	All other stainless steel mill shapes and forms ----- do..	(S)	1.0	(S)	4.9
Copper and copper-base alloy:					
335102	Rod, bar, and mechanical wire, including extruded and/ or drawn shapes ----- mil lb..	(S)	.8	(S)	.4
335143	Plate, sheet, and strip, including military cups and discs ----- do..	(D)	(D)	(S)	.3
335003	All other ----- do..	(S)	.2	*1	4.3
Aluminum and aluminum-base alloy:					
335301	Sheet, plate, and foil ----- mil lb..	(S)	.7	(S)	.6
335405	Extruded shapes, including rod, bar, pipe, tube, etc. ----- do..	(S)	.7	(S)	.9
335008	All other aluminum mill shapes and forms (wire, rolled rod and bar, powder, welded tubing, etc.) ----- do..	(S)	1.6	(S)	.2
335609	Nonferrous metal mill shapes and forms, except copper and aluminum -----	(X)	.8	(S)	2.7
329903	Industrial diamonds ----- carats..	(S)	13.8	(S)	9.2
Metal powders:					
339916	Tungsten carbide ----- mil lb..	(S)	99.7	(S)	107.5
339919	All other ----- do..	(S)	7.1	(S)	17.3
190023	Iron and steel scrap, excluding home scrap ----- 1,000 s tons..	(S)	1.8	(S)	.1

See footnotes at end of table.

Table 3. Materials Consumed by Kind: 1987 and 1982—Con.

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 material code	Material	1987		1982	
		Quantity ¹	Delivered cost (million dollars)	Quantity ¹	Delivered cost (million dollars)
INDUSTRY 3545, MACHINE TOOL ACCESSORIES					
—Con.					
Castings (rough and semifinished):					
332011	Iron (gray and malleable) ----- 1,000 s tons--	(S)	6.9	(S)	10.8
332045	Steel ----- do--	(S)	4.6	(S)	4.0
336005	Aluminum and aluminum-base alloy ----- mil lb--	(S)	1.3	*1.4	2.3
336006	Copper and copper-base alloy ----- do--	(S)	.2	(S)	.2
336008	Other nonferrous ----- do--	(S)	(Z)	(S)	.5
346200	Iron and steel forgings ----- 1,000 s tons--	(S)	1.1	(S)	1.8
Bearings, including mounted and unmounted:					
356218	Ball -----	(X)	4.7	(X)	2.8
356201	Roller -----	(X)	1.7	(X)	1.1
359411	Hydraulic and pneumatic equipment, including pumps and compressors -----	(X)	4.9	(X)	2.6
360101	Electric transmission, distribution, and control equipment -----	(X)	30.4	(X)	5.3
329101	Grinding wheels and other abrasive products, except industrial diamonds -----	(X)	33.8	(X)	19.2
345001	Bolts, nuts, screws, washers, rivets, and screw machine products -----	(X)	4.5	(X)	7.0
280020	Ceramic raw materials, including powders, chemicals, and fibers, excluding refractory uses -----	(X)	1.5	(X)	(⁵)
320601	Ceramic and ceramic composite parts, components, and accessories -----	(X)	(D)	(X)	(⁵)
970099	All other materials and components, parts, containers, and supplies -----	(X)	166.8	(X)	*182.9
971000	Materials, parts, containers, and supplies, n.s.k. ² -----	(X)	206.2	(X)	194.4
INDUSTRY 3546, POWER-DRIVEN HANDTOOLS					
Materials, parts, containers, and supplies -----		(X)	845.6	(X)	652.3
Mill shapes and forms, except castings and forgings:					
Carbon steel:					
331011	Bars and bar shapes ----- 1,000 s tons--	(S)	13.0	14.5	19.9
331012	Sheet and strip ----- do--	(S)	9.3	(S)	34.6
331006	All other carbon steel mill shapes and forms ----- do--	(S)			
Alloy steel, except stainless:					
331021	Bars and bar shapes ----- 1,000 s tons--	(S)	10.7	(S)	9.1
331029	All other alloy steel mill shapes and forms ----- do--	(S)		(S)	5.8
335609	Nonferrous metal mill shapes and forms, except copper and aluminum ----- do--	(D)	(D)	(S)	1.0
335770	Magnet wire ----- mil lb--	*9.4	13.8	*7.2	10.1
335792	Insulated copper wire and cable, except magnet wire (quantity of copper content) ----- do--	*3.2	11.3	(S)	6.8
Castings (rough and semifinished):					
332011	Iron (gray and malleable) ----- 1,000 s tons--	(S)	1.4	(S)	3.4
332045	Steel ----- do--	**1.4	14.3	(S)	6.0
336005	Aluminum and aluminum-base alloy ----- mil lb--	(S)	51.2	(S)	39.9
336003	Other nonferrous ----- do--	(S)	.1	(D)	*9.5
346200	Iron and steel forgings ----- 1,000 s tons--	(D)	(D)	**3.4	4.0
Electric motors and generators:					
362115	Fractional horsepower electric motors (less than 1 hp) (excluding timing motors) ----- thousands--	(S)	10.3	5 089.7	7.0
362120	Integral horsepower motors and generators (1 hp and larger) ----- do--	(D)	(D)	(D)	(⁷)
Bearings, including mounted and unmounted:					
356218	Ball -----	(X)	15.3	(X)	19.0
356201	Roller -----	(X)	3.5	(X)	3.6
356601	Speed changers, gears, and industrial high-speed drives -----	(X)	8.8	(X)	10.2
359411	Hydraulic and pneumatic equipment, including pumps and compressors -----	(X)	(D)	(X)	1.8
308006	Fabricated plastics products (except gaskets) -----	(X)	41.6	(X)	35.4
345001	Bolts, nuts, screws, fasteners, washers, rivets, and screw machine products -----	(X)	31.7	(X)	18.6
970099	All other materials and components, parts, containers, and supplies -----	(X)	441.9	(X)	*348.2
971000	Materials, parts, containers, and supplies, n.s.k. ² -----	(X)	150.1	(X)	58.4
INDUSTRY 3547, ROLLING MILL MACHINERY					
Materials, parts, containers, and supplies -----		(X)	192.7	(X)	*167.3
Mill shapes and forms, except castings and forgings:					
Carbon steel:					
331011	Bars and bar shapes ----- 1,000 s tons--	(S)	1.8	**4.9	2.0
331012	Sheet and strip ----- do--	(S)	(⁹)	*.5	.2
331013	Plates ----- do--	(S)	6.1	22.0	10.2
331015	Structural shapes ----- do--	(S)	2.0	4.5	2.3
331017	Wire and wire products ----- do--	(S)	*3.9	-	-
331019	All other carbon steel mill shapes and forms ----- do--	(S)		.7	.5
Alloy steel, except stainless:					
331021	Bars and bar shapes ----- 1,000 s tons--	(S)	4.2	(S)	5.6
331029	All other alloy steel mill shapes and forms ----- do--	(S)	.6		
331031	Stainless steel ----- do--	(S)	.1	(Z)	(Z)
335004	Copper and copper-base alloy ----- mil lb--	*.1	.3	(Z)	*.2
Aluminum and aluminum-base alloy:					
335301	Sheet, plate, and foil ----- mil lb--			(Z)	(Z)
335405	Extruded shapes, including extruded rod, bar, pipe, tube, etc. ----- do--	(S)	.6	-	-
335008	All other aluminum mill shapes and forms (wire, rolled rod and bar, powder, welded tubing, etc.) ----- do--	-	-	-	-
335609	Nonferrous metal mill shapes and forms (except copper and aluminum) ----- do--	(Z)	(Z)	-	-
335792	Insulated copper wire and cable, except magnet wire (quantity of copper content) ----- do--	(D)	(D)	(Z)	(Z)

See footnotes at end of table.

Table 3. **Materials Consumed by Kind: 1987 and 1982—Con.**

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 material code	Material	1987		1982	
		Quantity ¹	Delivered cost (million dollars)	Quantity ¹	Delivered cost (million dollars)
	INDUSTRY 3547, ROLLING MILL MACHINERY— Con.				
329101	Grinding wheels and other abrasive products, except industrial diamonds -----	(X)	.5	(X)	.5
190023	Iron and steel scrap, excluding home scrap ----- 1,000 s tons--	(D)	(D)	(D)	(D)
	Castings (rough and semifinished):				
332011	Iron (gray and malleable) ----- 1,000 s tons--	(S)	1.3	*2.7	2.9
332045	Steel ----- do--	**1.4	2.6	*3.3	4.9
336005	Aluminum and aluminum-base alloy ----- mil lb--	(Z)	(Z)	(Z)	(Z)
336006	Copper and copper-base alloy ----- do--	(S)	.5	(S)	(⁹)
336008	Other nonferrous ----- do--	(D)	(D)	-	-
346200	Iron and steel forgings ----- 1,000 s tons--	**26.1	22.3	14.8	15.8
349271	Fluid power (hydraulic and pneumatic) valves -----	(X)	.7	(X)	1.1
349261	Fluid power (hydraulic and pneumatic) hose or tube fittings and assemblies -----	(X)	(D)	(X)	(D)
	Electric motors and generators:				
	Fractional horsepower electric motors (less than 1 hp):				
362110	Timing motors, synchronous and subsynchronous ----- thousands--			(D)	(D)
362115	Other fractional horsepower electric motors (less than 1 hp) (excluding timing motors) ----- do--	(S)	4.2	-	-
362120	Integral horsepower motors and generators (1 hp and larger) ----- do--			(S)	4.1
	Bearings, including mounted and unmounted:				
356218	Ball -----	(X)	(D)	(X)	2.9
356201	Roller -----	(X)	1.7	(X)	9.3
356601	Speed changers, gears, and industrial high-speed drives -----	(X)	6.3	(X)	17.0
	Pumps (complete assemblies):				
359412	Hydraulic fluid power pumps, motors, and hydrostatic transmissions ----- thousands--	(D)	(D)	(S)	3.5
356102	Other pumps ----- do--	(D)	(D)	(S)	1.1
356301	Air and gas compressors ----- do--	(D)	(D)	(D)	(D)
356921	Filters for hydraulic fluid power systems -----	(X)	(Z)	(X)	.1
359301	Fluid power (hydraulic and pneumatic) cylinders and rotary actuators -----	(X)	1.3	(X)	1.7
359302	Hydraulic and pneumatic equipment (except pumps, compressors, cylinders, and rotary actuators) -----	(X)	.4	(X)	(D)
360101	Electric transmission, distribution, and control equipment -----	(X)	.4	(X)	3.6
265001	Paperboard containers, boxes, and corrugated paperboard -- 1,000 s tons--	(X)	(D)	(Z)	(Z)
305201	Rubber and plastics hose and belting -----	(X)	.1	(X)	.1
345001	Bolts, nuts, screws, washers, rivets, and screw machine products -----	(X)	.6	(X)	1.0
354501	Cutting tools for machine tools -----	(X)	1.2	(X)	1.9
362001	Electrical industrial capacitors, resistors, rheostats, and coil windings -----	(X)	(D)	(X)	(D)
362520	Numerical controls for metalworking machinery (except programmable) -----	(X)	-	(X)	(D)
362521	Programmable controllers for metalworking machinery -----	(X)	5.5	(X)	(D)
970099	All other materials and components, parts, containers, and supplies -----	(X)	72.5	(X)	351.6
971000	Materials, parts, containers, and supplies, n.s.k. ² -----	(X)	41.3	(X)	34.6
	INDUSTRY 3548, WELDING APPARATUS				
	Materials, parts, containers, and supplies -----	(X)	¹⁰ 893.2	(NA)	(¹⁰)
	Mill shapes and forms, except castings and forgings:				
	Carbon steel:				
331011	Bars and bar shapes ----- 1,000 s tons--	(S)	8.7	(NA)	(NA)
331012	Sheet and strip ----- do--	*84.0	48.0	(NA)	(NA)
331013	Plates ----- do--	(S)	5.9	(NA)	(NA)
331015	Structural shapes ----- do--	(S)	1.4	(NA)	(NA)
331017	Wire and wire products ----- do--	222.8	80.6	(NA)	(NA)
331019	All other carbon steel mill shapes and forms ----- do--	*10.0	4.3	(NA)	(NA)
	Alloy steel, except stainless:				
331021	Bars and bar shapes ----- 1,000 s tons--	(S)	1.1	(NA)	(NA)
331029	All other alloy mill shapes and forms ----- do--	(D)	(⁹)	(NA)	(NA)
331031	Stainless steel ----- do--	(S)	10.2	(NA)	(NA)
335001	Aluminum and aluminum-base alloy mill shapes and forms ----- mil lb--	(S)	20.5	(NA)	(NA)
335004	Copper and copper-base alloy ----- do--	(S)	50.2	(NA)	(NA)
335792	Insulated copper wire and cable, except magnet wire (quantity of copper content) ----- do--	(S)	9.4	(NA)	(NA)
	Castings (rough and semifinished):				
332001	Iron (gray and malleable) and steel ----- 1,000 s tons--	(S)	2.4	(NA)	(NA)
336006	Copper and copper-base alloy ----- mil lb--	(S)	7.0	(NA)	(NA)
336005	Other nonferrous ----- do--	(S)	2.1	(NA)	(NA)
	Electric motors and generators:				
	Fractional horsepower electric motors (less than 1 hp):				
362110	Timing motors, synchronous and subsynchronous ----- millions--	(S)	1.3	(NA)	(NA)
362115	Other fractional horsepower electric motors (excluding timing motors) ----- thousands--	447.7	9.4	(NA)	(NA)
362120	Integral horsepower motors and generators (1 hp and larger) ----- do--	(S)	.2	(NA)	(NA)
	Bearings, including mounted and unmounted:				
356218	Ball -----	(X)	3.4	(NA)	(NA)
356201	Roller -----	(X)	.9	(NA)	(NA)
356601	Speed changers, gears, and industrial high-speed drives -----	(X)	3.4	(NA)	(NA)
360101	Electric transmission, distribution, and control equipment -----	(X)	12.6	(NA)	(NA)
265001	Paperboard containers, boxes, and corrugated paperboard -- 1,000 s tons--	(S)	12.3	(NA)	(NA)
305201	Rubber and plastics hose and belting -----	(X)	4.3	(NA)	(NA)
345001	Bolts, nuts, screws, washers, rivets, and screw machine products -----	(X)	7.9	(NA)	(NA)

See footnotes at end of table.

Table 3. Materials Consumed by Kind: 1987 and 1982—Con.

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 material code	Material	1987		1982	
		Quantity ¹	Delivered cost (million dollars)	Quantity ¹	Delivered cost (million dollars)
	INDUSTRY 3548, WELDING APPARATUS—Con.				
362001	Electrical industrial capacitors, resistors, rheostats, and coil windings	(X)	23.7	(NA)	(NA)
970099	All other materials and components, parts, containers, and supplies	(X)	³ 324.8	(NA)	(NA)
971000	Materials, parts, containers, and supplies, n.s.k. ²	(X)	237.2	(NA)	(NA)
	INDUSTRY 3549, METALWORKING MACHINERY, N.E.C.				
	Materials, parts, containers, and supplies	(X)	¹⁰ 388.5	(NA)	(¹⁰)
	Mill shapes and forms, except castings and forgings:				
	Carbon steel:				
331011	Bars and bar shapes	(S)	6.9	(NA)	(NA)
331012	Sheet and strip	(S)	2.1	(NA)	(NA)
331013	Plates	(S)	3.9	(NA)	(NA)
331015	Structural shapes	(S)	2.1	(NA)	(NA)
331017	Wire and wire products	(S)	.3	(NA)	(NA)
331019	All other carbon steel mill shapes and forms	(S)	3.6	(NA)	(NA)
	Alloy steel, except stainless:				
331021	Bars and bar shapes	(S)	3.9	(NA)	(NA)
331029	All other alloy steel mill shapes and forms	(S)	.5	(NA)	(NA)
331031	Stainless steel	(S)	.2	(NA)	(NA)
335004	Copper and copper-base alloy	(S)	.1	(NA)	(NA)
	Aluminum and aluminum-base alloy:				
335301	Sheet, plate, and foil	(S)	2.4	(NA)	(NA)
335405	Extruded shapes, including extruded rod, bar, pipe, tube, etc.	(S)	6.2	(NA)	(NA)
335008	All other aluminum mill shapes and forms (wire, rolled rod and bar, powder, welded tubing, etc.)	* 6	.9	(NA)	(NA)
335609	Nonferrous metal mill shapes and forms (except copper and aluminum)	(S)	.1	(NA)	(NA)
335792	Insulated copper wire and cable, except magnet wire (quantity of copper content)	(S)	1.0	(NA)	(NA)
329101	Grinding wheels and other abrasive products, except industrial diamonds	(X)	.4	(NA)	(NA)
190023	Iron and steel scrap, excluding home scrap	-	-	(NA)	(NA)
	Castings (rough and semifinished):				
332011	Iron (gray and malleable)	(S)	4.1	(NA)	(NA)
332045	Steel	(S)	.9	(NA)	(NA)
336005	Aluminum and aluminum-base alloy	(S)	4.7	(NA)	(NA)
336006	Copper and copper-base alloy	(S)	.3	(NA)	(NA)
336008	Other nonferrous	(S)	.7	(NA)	(NA)
346200	Iron and steel forgings	(S)	2.9	(NA)	(NA)
349271	Fluid power (hydraulic and pneumatic) valves	(X)	1.1	(NA)	(NA)
349261	Fluid power (hydraulic and pneumatic) hose or tube fittings and assemblies	(X)	1.1	(NA)	(NA)
	Electric motors and generators:				
	Fractional horsepower electric motors (less than 1 hp):				
362110	Timing motors, synchronous and subsynchronous	(S)	1.4	(NA)	(NA)
362115	Other fractional horsepower electric motors (less than 1 hp) (excluding timing motors)	(S)	1.2	(NA)	(NA)
362120	Integral horsepower motors and generators (1 hp and larger)	(S)	2.9	(NA)	(NA)
	Bearings, including mounted and unmounted:				
356218	Ball	(X)	1.7	(NA)	(NA)
356201	Roller	(X)	1.2	(NA)	(NA)
356601	Speed changers, gears, and industrial high-speed drives	(X)	6.1	(NA)	(NA)
	Pumps (complete assemblies):				
359412	Hydraulic fluid power pumps, motors, and hydrostatic transmissions	(S)	2.5	(NA)	(NA)
356102	Other pumps	** .8	.4	(NA)	(NA)
356301	Air and gas compressors	** .1	.3	(NA)	(NA)
356921	Filters for hydraulic fluid power systems	(X)	.4	(NA)	(NA)
359301	Fluid power (hydraulic and pneumatic) cylinders and rotary actuators	(X)	2.3	(NA)	(NA)
359302	Hydraulic and pneumatic equipment (except pumps, compressors, cylinders, and rotary actuators)	(X)	1.6	(NA)	(NA)
360101	Electric transmissions, distribution, and control equipment	(X)	9.4	(NA)	(NA)
265001	Paperboard containers, boxes, and corrugated paperboard	(S)	.2	(NA)	(NA)
305201	Rubber and plastics hose and belting	(X)	.4	(NA)	(NA)
345001	Bolts, nuts, screws, washers, rivets, and screw machine products	(X)	1.4	(NA)	(NA)
354501	Cutting tools for machine tools	(X)	1.6	(NA)	(NA)
362001	Electrical industrial capacitors, resistors, rheostats, and coil windings	(X)	1.2	(NA)	(NA)
362520	Numerical controls for metalworking machinery (except programmable)	(X)	1.6	(NA)	(NA)
362521	Programmable controllers for metalworking machinery	(X)	5.4	(NA)	(NA)
970099	All other materials and components, parts, containers, and supplies	(X)	110.1	(NA)	(NA)
971000	Materials, parts, containers, and supplies, n.s.k. ²	(X)	185.9	(NA)	(NA)

¹For some establishments, data have been estimated from central unit values which are based on quantity-cost relationships of reported data. The following symbols are used when percentage of each quantity figure estimated in this manner equals or exceeds 10 percent of published figure: * 10 to 19 percent estimated; ** 20 to 29 percent estimated. If 30 percent or more is estimated, figure is replaced by (S).

²Total cost of materials of establishments that did not report detailed materials data, including establishments that were not mailed a form.

³Data are included with material code 970099 to avoid disclosing data for individual companies.

⁴For 1982, data for material code 335003 included only copper and copper-base alloy bare wire for electrical conduction and pipe and tube.

⁵For 1982, data for material codes 280020 and 320601 were not collected separately but were included with material code 970099.

⁶For 1982, data for copper and copper-base alloy castings (rough and semifinished) were included with material code 970099 to avoid disclosing data for individual companies.

⁷For 1982, total included data for copper and copper-base alloy rod, bar, and mechanical wire, including extruded and/or drawn shapes and pipe and tube and fabricated rubber products (except tires, tubes, hose, belting, and gaskets).

⁸For 1987, data for material code 331012 were combined with material code 331019 to avoid disclosing data for individual companies.

⁹For 1982, data included only copper and copper-base alloy plate, sheet, and strip, including military cups and discs.

¹⁰Industry definition is new for 1987; therefore, 1987 data for materials consumed are not comparable to prior-year data. As a result, 1982 materials consumed data are not available.



APPENDIX

Scope and Coverage and Explanation of Terms

GENERAL

The 1987 Census of Manufactures is the 32nd census of manufacturing establishments conducted in the United States. For 1987, it was conducted as part of the economic censuses, which included the censuses of mineral industries, construction industries, retail and wholesale trades, service industries, selected transportation activities, and minority-owned and women-owned businesses, under authority of title 13 of the United States Code. Title 13 specifies that an economic census be conducted every 5 years to cover years ending in 2 and 7.

SCOPE AND COVERAGE

Establishment Basis of Reporting

The census of manufactures is conducted on an establishment basis. All manufacturing establishments with one paid employee or more at any time during the year are covered by the census of manufactures. Therefore, a company operating at more than one location is required to file a separate report for each location. This report excludes information for separately operated administrative offices, warehouses, garages, and other auxiliary units which service manufacturing establishments of the same company. Where these auxiliary operations are conducted at the same location as the manufacturing operation, they are usually included in the report for the operating manufacturing establishment.

Use of Administrative Records

From a universe of approximately 350,000 manufacturing establishments in the 1987 Census of Manufactures, approximately 150,000 small single-establishment companies were excused from filing reports. Selection of the small establishment nonmail cases was done on an industry-by-industry basis. A variable cutoff was used to determine those establishments for which administrative records were to be used in place of a census report. The cutoffs were selected so the administrative-record cases would account for approximately 3 percent or less of the value of shipments for the industry. These cutoffs were then adjusted so that all single-establishment companies with less than 5 employees were excluded from the mail canvass, while all establishments with more than 20 employees were included. Where establishments in the 5 to 20 employee size range were included in the mail canvass, an abbreviated census form was frequently used.

For these nonmail establishments, (and a small number of larger establishment whose reports were not received at the time the data were tabulated) data on employment, payroll, and receipts were obtained from administrative records of other government agencies rather than from census forms. The administrative-record information was then used in conjunction with industry averages to estimate the data for these establishments. The value of shipments and cost of materials were not distributed among specific products and materials but were included in the product and material "not specified by kind" (n.s.k.) categories.

EXPLANATION OF TERMS

Number of establishments and companies—A separate report was required for each manufacturing establishment (plant) with one employee or more. An establishment is defined as a single physical location where manufacturing is performed. A company, on the other hand, is defined as a business organization consisting of one establishment or more under common ownership or control.

All employees—Includes all full-time and part-time employees on the payrolls at any time during the year. Included are all persons on paid sick leave, paid holidays, and paid vacations. Officers of corporations are included as employees; proprietors and partners of unincorporated firms are excluded. The "all employees" number is the average number of production workers plus the number of other employees in mid-March. The number of production workers is the average of those for midmonth payroll periods of March, May, August, and November.

Production workers—Includes workers up through the working-supervisor level engaged in fabricating, processing, assembling, inspecting, receiving, packing, warehousing, shipping (but not delivering), maintenance, repair, janitorial, guard services, product development, auxiliary production for plant's own use (e.g., power-plant), recordkeeping, and other closely associated services. Truckdrivers delivering ready-mixed concrete are also included in production workers.

Other employees—Includes nonproduction personnel, including those engaged in the following activities: supervision above working-supervisor level, sales (including driver/salespersons), sales delivery (truckdrivers and helpers), advertising, credit collection, installation and

servicing of own product, clerical and routine office functions, executive, purchasing, finance, legal, personnel (including cafeteria, etc.), professional, and technical employees.

Payroll—Includes the gross earnings for the “employees” defined above, such as salaries, wages, commissions, dismissal pay, bonuses, vacation and sick leave pay, and compensation in kind, prior to such deductions as employees’ Social Security contributions, withholding taxes, group insurance, union dues, and savings bonds. Respondents were told that in reporting they could follow the definition of payrolls used for calculating the Federal withholding tax.

Production-worker hours—Covers hours worked or paid for at the plant, including actual overtime hours (not straight-time equivalent hours). It excludes hours paid for vacations, holidays, or sick leave when the employee was not at the plant.

Cost of materials—Refers to direct charges actually paid or payable for items consumed or put into production during the year, including freight charges and other direct charges incurred by the establishment in acquiring these materials. It includes the cost of materials or fuels consumed, regardless of whether they were purchased by the individual establishment from other companies, transferred to it from other establishments of the same company, or withdrawn from inventory during the year.

The important components of this cost item are (a) all raw materials, semifinished goods, parts, containers, scrap, and supplies put into production or used as operating supplies and for repair and maintenance during the year; (b) electric energy purchased; (c) fuels consumed for heat, power, or generating electricity; (d) work done by others on materials or parts furnished by manufacturing establishments (contract work); and (e) products bought and resold in the same condition.

Specific materials consumed (table 3)—In addition to the total cost of materials which every establishment was required to report, information was also collected for most manufacturing industries on the consumption of major materials used in manufacturing. These inquiries were restricted to those materials which were important parts of the cost of production in a particular industry and for which cost information was available from manufacturers’ records. Establishments consuming less than a specified amount (usually \$10,000) of a specific material were not requested to report consumption of that material separately. Also, the cost of materials for the small establishments for which administrative records were used was estimated as “not specified by kind” (n.s.k.).

Value of shipments and other receipts—Generally refers to received or receivable net selling values, f.o.b. plant (exclusive of freight and taxes), of all products shipped, both primary and secondary, as well as all

miscellaneous receipts such as receipts for contract work performed for others, installation and repair receipts, sale of scrap, and sale of products bought and resold without further processing. Included are all items made by or for the establishment from materials owned by it whether sold, transferred to other plants of the same company, or shipped on consignment. The net selling value of products made in one plant on a contract basis from materials owned by another was reported by the plant providing the materials.

In a few industries, the value of production or value of work completed is used instead of value of shipments. These industries are identified in the introduction and are footnoted in table 1.

In the case of multiunit companies, the manufacturer was requested to report the value of products transferred to other establishments of the same company at full economic or commercial value, that is, including not only the direct costs of production but also a reasonable proportion of “all other costs” (including company overhead and profit).

Shipments or production of individual products (table 2)—In the 1987 census, detailed shipment information was collected for approximately 11,000 individual products. These products are identified by a seven-digit code and are grouped into approximately 1,500 classes of products, which in turn are primary to 459 four-digit industries. Data at the five-digit product-class level have been collected each year as part of the annual survey of manufactures. Information at the seven-digit level, collected for many industries in the current industrial reports program, is not included in this table.

Value added by manufacture—This measure of manufacturing activity is derived by subtracting the cost of materials, supplies, containers, fuel, purchased electricity, and contract work from the value of shipments for products manufactured plus receipts for services rendered. The result of this calculation is then adjusted by the addition of value added by merchandising operations (that is, the difference between the sales value and cost of merchandise sold without further manufacturing, processing, or assembly) plus the net change in finished goods and work-in-process inventories between the beginning and end of the year.

For those industries where value of production is collected instead of value of shipments (see footnote in table 1), value added is adjusted only for the change in work-in-process inventories between the beginning and end of the year. For those industries where value of work done is collected, the value added does not include an adjustment for the change in finished goods or work-in-process inventories.

Value added avoids the duplication in the figure for value of shipments which results from the use of products of some establishments as materials by others. Value

added is considered to be the best value measure available for comparing the relative economic importance of manufacturing among industries and geographic areas.

Expenditures for new plant and equipment—Establishments in operation and any known plants under construction were asked to report their expenditures for (a) permanent additions and major alterations to manufacturing establishments and (b) new machinery and equipment used for replacement and additions to plant capacity if they are of the type for which depreciation accounts are ordinarily maintained.

These totals exclude expenditures for used plant and equipment, expenditures for land, and cost of maintenance and repairs charged as current operating expenses. Data for used plant and equipment will be published in the final industry bulletin.

End-of-year inventories—Comprised of (a) finished products; (b) work-in-process; and (c) materials, supplies, fuels, etc. Beginning in 1982, respondents were asked to report their inventories at (the lower of) cost or market prior to adjustment to LIFO cost. This is a change from prior years in which respondents were permitted to value their inventories using any generally accepted accounting method.

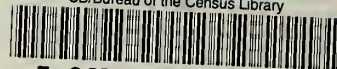
Therefore, 1982 through 1987 data for inventories are not strictly comparable to prior-year data.

Specialization and coverage ratios—An establishment is classified in a particular industry if its shipments of primary products of the industry exceed in value its shipments of the products of any other single industry. An establishments' shipments include those products assigned to an industry (primary products), those considered primary to other industries (secondary products), and receipts for miscellaneous activities (merchandising, contract work, resales, etc.). The following ratios have been developed to measure the relationship of primary product shipments to the data on shipments for the industry shown in table 1 and data on product shipments shown in table 2.

Specialization ratio—Represents the ratio of primary product shipments to total product shipments (primary and secondary, excluding miscellaneous receipts) for the establishments classified in the industry.

Coverage ratio—Represents the ratio of primary products shipped by the establishments classified in the industry to the total shipments of such products that are shipped by all manufacturing establishments, wherever classified.

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